

ORIGINAL



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BEFORE THE ARIZONA CORPORATION COMMISSION

JEFF HATCH-MILLER  
Chairman

WILLIAM A. MUNDELL  
Commissioner

MARC SPITZER  
Commissioner

MIKE GLEASON  
Commissioner

KRISTIN K. MAYES  
Commissioner

AZ CORP COMMISSION  
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In the Matter of Level 3 Communications, )  
LLC's Petition for Arbitration Pursuant to )  
Section 252(b) of the Communications Act of )  
1934, as amended by the Telecommunications )  
Act of 1996, and the Applicable State Laws for )  
Rates, Terms, and Conditions of )  
Interconnection with Qwest Corporation )

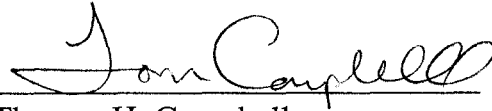
Docket Nos. T-01051B-05-0350  
T-03654A-05-0350

**NOTICE OF FILING TESTIMONY**

On July 15, 2005, Level 3 Communication, LLC ("Level 3") filed the attached direct testimony of Rogier R. Ducloo and Timothy J. Gates in the above referenced matter.

RESPECTFULLY SUBMITTED this 15th day of July, 2005.

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A handwritten signature in dark ink, appearing to read "Tom Campbell", is written over a horizontal line.

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15<sup>th</sup> day of July, 2005, with:

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COPY of the foregoing hand-delivered  
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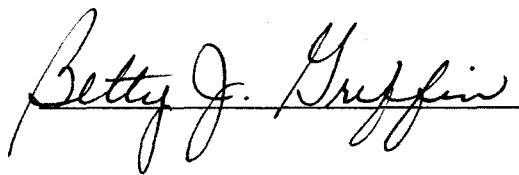
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**DOCKET NO. T-01051B-05-0350, T-03654A-05-0350**

|                                     |          |                            |
|-------------------------------------|----------|----------------------------|
| <b>PETITION OF LEVEL 3</b>          | <b>§</b> | <b>BEFORE THE</b>          |
| <b>COMMUNICATIONS, LLC FOR</b>      | <b>§</b> |                            |
| <b>COMPULSORY ARBITRATION WITH</b>  | <b>§</b> | <b>ARIZONA CORPORATION</b> |
| <b>QWEST CORPORATION</b>            |          |                            |
|                                     |          | <b>COMMISSION</b>          |
|                                     | <b>§</b> |                            |
| <b>UNDER FTA RELATING TO RATES,</b> | <b>§</b> |                            |
| <b>TERMS, AND CONDITIONS OF</b>     | <b>§</b> |                            |
| <b>INTERCONNECTION</b>              | <b>§</b> |                            |

**DIRECT TESTIMONY OF ROGIER R. DUCLOO**  
**ON BEHALF OF LEVEL 3 COMMUNICATIONS, LLC**

**July 15, 2005**

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1                   **DIRECT TESTIMONY OF ROGIER R. DUCLOO**  
2                   **ON BEHALF OF LEVEL 3 COMMUNICATIONS, LLC**

3    **I.        Introduction**

4    **Q.     PLEASE STATE YOUR NAME, POSITION, EMPLOYER, AND**  
5       **BUSINESS ADDRESS.**

6    A.    My name is Rogier R. Ducloo. I am a Director with Level 3 Communications,  
7           LLC. My business address is 1025 Eldorado Blvd, Colorado, 8021. I am filing  
8           this testimony on behalf of Level 3 Communications, LLC of Broomfield, CO.

9    **Q.     PLEASE REVIEW YOUR EDUCATION AND RELEVANT WORK**  
10       **EXPERIENCE.**

11   A.    I received a Bachelor of Science in Business and Management from the  
12           University of Amsterdam, the Netherlands in 1996. I've worked at Level 3 since  
13           1998. Most of my experience with Level 3 has been with the company's network  
14           group. I've worked in network provisioning, network engineering & design, and  
15           network planning & project management of network deployment. Since 2002, I  
16           have worked in network planning and regulatory support. Prior to joining Level 3  
17           I worked in business development and international institutional sales.

1     **II.         Statement Of Scope And Summary**

2     **Q.         WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

3     A.         I am testifying on behalf of Level 3 Communications, LLC ("Level 3"), regarding  
4                 interconnection agreement terms and conditions between Level 3 and Qwest that  
5                 we have been unable to resolve during negotiations. I will address various  
6                 technical issues to provide a network and engineering perspective for the issues  
7                 that are in dispute in this case. As part of my presentation, I will also address  
8                 some high-level technology policy issues that are embedded in the nation's  
9                 communications laws, as I understand them, and how those policies relate to this  
10                case.

11    **Q.         PLEASE SUMMARIZE YOUR TESTIMONY, INCLUDING YOUR**  
12    **CONCLUSIONS AND RECOMMENDATIONS.**

13    A.         Level 3 is a facilities-based Competitive Local Exchange Carrier ("CLEC"). To  
14                 facilitate fair competition, and for Level 3 to meet customer demands, Level 3  
15                 must be permitted to interconnect with Qwest on reasonable terms, rates and  
16                 conditions. Moreover, because of Level 3's experience operating the largest next-  
17                 generation, end-to-end Internet Protocol ("IP")-based network in the United  
18                 States, Level 3 is uniquely positioned to propose terms that are not only  
19                 reasonable and technically sound, but also consistent with the overall public

1 interest in the continued technical advancement of the nation's communications  
2 infrastructure.

3 Qwest, in contrast, takes an extremely limited and one-sided view of  
4 interconnection. The Qwest-sponsored provisions to which Level 3 objects would  
5 cause inefficiencies in the network by, among other things, requiring technically  
6 unnecessary trunks and facilities, as well as changes to efficient interconnection  
7 architecture. As a result, Qwest's proposals are detrimental to overall network  
8 efficiency, quality, and to Level 3's ability to offer services in furtherance of the  
9 public interest in facilitating and developing a competitive telecommunications  
10 market. As summarized here and as explained in greater detail below, Qwest's  
11 one-sided proposals cause problems at several levels.

12 First, Qwest proposes to place a number of restrictions on switching and trunking  
13 operations. It does this through the definitions of various terms in the Agreement.  
14 None of these restrictions has any technical basis. In each case, Qwest would  
15 impose engineering inefficiencies on Level 3 (and in some cases on Qwest itself  
16 as well) for no reason other than, as far as I can tell, to impede Level 3's growth  
17 or to extract extra revenues from us. These definitional issues affect the outcome

1 of Issues 1 and 2 and I deal with the definitional concerns in the course of  
2 discussing the relevant issues.

3 Second, the companies disagree on the how to divide the traffic we send each  
4 other into different trunk groups. We agree that when total traffic between Level  
5 3 and a particular Qwest end office switch reaches a certain reasonable volume,  
6 we will establish a direct trunk group between that end office and Level 3. The  
7 technical and engineering efficiency of both parties' networks will be maximized  
8 by including all traffic between Level 3 and the affected Qwest switch on a single  
9 large trunk group. Qwest, however, wants us to establish multiple trunk groups  
10 between each pair of switches, with the traffic divided based on regulatory  
11 classifications that have no engineering significance. This is, pure and simply,  
12 inefficient. I understand that governing law requires the terms and conditions of  
13 interconnection to be "reasonable." From an engineering perspective, what Qwest  
14 is proposing is patently unreasonable. Level 3 fully recognizes that different  
15 regulatory "types" of traffic might be subject to different rates; but we have a  
16 proposal for dealing with that situation simply and efficiently, without degrading  
17 network efficiency and imposing needless costs, discussed below.

1 Third, in Issue 4 Qwest is arguing that certain types of Enhanced Service Provider  
2 (“ESP”) traffic, including specifically VoIP traffic, should be included within the  
3 regulatory category of switched access traffic. My understanding is that the status  
4 of traffic as ESP traffic depends on certain technical characteristics of the entities  
5 that provide it, so that entities that qualify as ESPs are entitled to have their traffic  
6 rated on an end-user basis, as opposed to on a carrier basis. I understand that  
7 there are legal and regulatory considerations affecting this issue which Level 3’s  
8 lawyers will address in our filings. From a technical perspective, however, it is  
9 clear that VoIP traffic is a form of information service, that is, the VoIP providers  
10 that Level 3 serves meet what I understand to be the relevant criteria for having  
11 their traffic treated as end-user, as opposed to carrier, traffic. In this regard, and  
12 irrespective of how this traffic is rated (reciprocal compensation versus access),  
13 Qwest also seeks to have ESP traffic, including VoIP traffic, routed over distinct  
14 trunk groups and perhaps over distinct facilities. For the reasons noted above, this  
15 is grossly inefficient and patently unreasonable.

16 In Issue No. 3 the ISP/RUF (VNXX) issue, Qwest is trying to shift the financial  
17 responsibility for maintaining its own network, on its side of the Point of  
18 Interconnection (“POI”), to Level 3. As a contractual matter, the parties agree  
19 that the cost of facilities used to connect their networks will be split based on

1 relative use, so that cost responsibility follows in proportion to which party  
2 originates which portion of traffic on the affected facilities. But what Qwest  
3 seeks to do is to exclude from the calculation the overwhelming majority of traffic  
4 that it sends to Level 3. As a simple matter of mathematics, this sleight-of-hand  
5 would relieve Qwest of cost responsibility for facilities that Qwest uses (in the  
6 sense of originates traffic over) much, much more than Level 3 does. In certain  
7 cases (so-called "VNXX" traffic), Qwest would go even farther, and would send  
8 Level 3 bills for originating intrastate access charges. Again, Level 3's lawyers  
9 will address the legal flaws in Qwest's position, but from an engineering  
10 perspective, treating VNXX calls like intrastate toll traffic is absurd.

11 The **LIS NRC** section continues the issue of who is responsible for the cost of  
12 interconnection, and explains why Qwest should not be able to pass the cost of  
13 installation and maintenance of its own network to Level 3.

14 Finally, the section of the **Determination of Traffic Types** provides a description  
15 of how Level 3 proposes to calculate the traffic mix on trunks. The section also  
16 explains a dispute over the new way that Qwest is proposing to determine whether  
17 a call is "local" or not. New contract language is proposed in this section to

1 specify Level 3's proposal on how to calculate and manage traffic factors for  
2 billing purposes.

3 **Q. TO PROVIDE SOME BACKGROUND, PLEASE GIVE A BRIEF**  
4 **OVERVIEW OF THE DIFFERENCE BETWEEN THE QWEST CIRCUIT**  
5 **SWITCH-BASED NETWORK AND LEVEL 3'S SOFTSWITCH-BASED**  
6 **NETWORK.**

7 A. Qwest's network is comprised of circuit switches connected to each other by fiber  
8 and copper transmission paths, and to end user customers largely by means of  
9 copper loops. Qwest's Class 4 (tandem) and Class 5 (end office) switches are the  
10 "brains" of its network. Like the traditional PSTN of which it is a part, the Qwest  
11 network operates using a centralized architecture which evolved starting more  
12 than 50 years ago with the introduction of automatic (originally, mechanical)  
13 circuit switching. The entire design objective of the PSTN was to do just one  
14 thing — deliver voice calls — very, very well. This design objective led to the  
15 old Bell System's implementation of computerized switches in a hierarchical  
16 architecture, the development of time-division multiplexing for use initially on  
17 copper and later on optical fiber, as well as the design of customer premises  
18 equipment and the specification of the interfaces between that equipment and the  
19 PSTN. The goal, and the result, of this focus was a network in which end-to-end

1 network resources are devoted to the completion of large volumes of plain old  
2 voice telephone calls.

3 Level 3's network is quite different, arising not out of the hierarchical, circuit-  
4 switched PSTN but instead out of the distributed, open architecture of the  
5 Internet. The Internet evolved as a scientific, educational and military network  
6 outside the PSTN, beginning in the 1960s. The Internet uses packet switching,  
7 not circuit switching. Rather than devoting end-to-end network resources to  
8 communicate information (voice or otherwise), a packet switched network breaks  
9 the information down into pieces (packets) and then separately routes the packets  
10 to their destination, often by very diverse routes, based dynamically on which  
11 switches (called "routers" on the Internet) and links are free or busy on a near-  
12 instantaneous basis. The packets are then reassembled into the proper order at the  
13 destination, so that the information is properly delivered.

14 Using Internet Protocol technology, Level 3 operates a distributed softswitch  
15 architecture. All internal connections between nodes on Level 3's network are by  
16 means of high-capacity optical fiber. Level 3's softswitch- and IP-based network  
17 is based on an open architecture that optimizes the use of computing technology  
18 to maximize the efficiency of the network infrastructure transport layer.

1       Softswitch technology is able to bridge the gap between legacy circuit-switched  
2       technology and more advanced IP-based networks. Because it knew that its  
3       customers would need to interface with the PSTN, Level 3 retro-engineered its  
4       network — from one perspective, “dumbed it down” — to be able to exchange  
5       IP-based traffic with the PSTN.

6       A simple metaphor illustrates the difference. Qwest’s network is like a funny  
7       kind of highway system. Imagine dedicated roads leading traffic from one point  
8       to another on fixed highways with multiple lanes, like the real highway system.  
9       On a circuit-switched network like Qwest’s, however, when there is a car running  
10      down one lane of the highway — say on a trip from Seattle to Phoenix — no  
11      other car is allowed be in its lane, all the way from Seattle to Phoenix. Only when  
12      the first car has completed its journey can any other car use “its” lane.

13      In contrast, Level 3’s softswitch and router based network is like the human brain.  
14      It is a smart, highly interconnected network that functions in parallel, so that  
15      traffic can take many different paths to get to the same place, and packets  
16      containing bits from different conversations can travel the same path at the same  
17      time for part, or all, of the route.

1 From Level 3's perspective, the technical superiority of its flexible, IP-based  
2 network is obvious — even for the traditional mainstay of the PSTN, voice calls.  
3 From both an engineering and business perspective, this is extremely threatening  
4 to PSTN operators like Qwest, who have enormous amounts of money and  
5 expertise invested in what is manifestly an old-fashioned and increasingly  
6 obsolete way of doing things. It is only natural that those with such a heavy  
7 investment in old technology and old knowledge would do everything possible to  
8 delay the day when they are overtaken by the new. For that reason, it is  
9 understandable why Qwest would want to shoe-horn Level 3's operations, as  
10 much as possible, into network architectures, regulatory classifications, and  
11 business models that Qwest understands, and that are in harmony with Qwest's  
12 own network and operations. But the entire point of introducing competition into  
13 the telecommunications business — at least from my technical perspective — is  
14 to make it possible for consumers to enjoy the benefits made possible by newer  
15 and more technically sophisticated networks. In assessing what constitutes  
16 "reasonable" terms for interconnection in this proceeding, therefore, I urge the  
17 Commission to recognize and take account of this fact. I submit that on the issues  
18 I address, Qwest is acting primarily to avoid the impact of new technology-based

1 competition on its legacy network, not in the best interest of the citizens of  
2 Arizona.

3 **Q. WHERE DOES LEVEL 3 FIT INTO THE BROADER**  
4 **COMMUNICATIONS INDUSTRY?**

5 A. Level 3 is not a traditional competitive local exchange carrier ("CLEC").

6 In broad terms, many of the CLECs that were created following the 1996 Act had  
7 a business model that boiled down to, "do what the incumbent does, only 5%  
8 better." As the regulatory authorities have come to appreciate the need to  
9 encourage competition based on investment in competing facilities, this business  
10 model has become increasingly unviable. Many of the CLECs that have gone into  
11 bankruptcy or been acquired by rivals had placed key reliance on this now-  
12 superseded business model.

13 Level 3, however, takes a very different approach. Level 3's business focuses  
14 not only on the traditional public switched telephone network (PSTN), but also —  
15 in fact, even more directly — on the Internet. As noted above, Level 3's entire  
16 network architecture arose out of the architecture of the Internet. The Internet  
17 uses packet switching, mainly developed in the 1970s, as opposed to circuit  
18 switching, developed, essentially, in the 1870s. (When the original, 19<sup>th</sup> Century

1 version of "Ernestine the Operator" plugged a line into her circuit board, she was  
2 doing just what circuit switches do today: creating a dedicated path between two  
3 customers for the duration of their call.)

4 While Level 3 certainly functions as a "local" exchange carrier, in fact Level 3's  
5 operations are nationwide, and more, in scope. Level 3 has billions of dollars  
6 invested in its network, which consists of an all fiber-optic backbone connected to  
7 68 markets in the U.S. and 17 markets in Europe. Level 3 has over 16,000 route  
8 miles of fiber in the US and an additional 3600 route miles in Europe. Riding on  
9 this fiber backbone, Level 3 maintains a separate, private IP network, composed  
10 of high-speed links (carried over the fiber optic facilities) and core routers (which  
11 direct enormous volumes of packetized traffic to the appropriate destinations).  
12 The Level 3 IP backbone is connected to the public Internet by means of hundreds  
13 of peering arrangements with other large Internet entities, located in  
14 approximately 30 different metropolitan areas.

15 One key technical contrast between Level 3 and an ILEC is that, unlike the  
16 ILECs, Level 3 embraces and seeks out robust interconnection with other  
17 networks. As a result, Level 3 is extensively interconnected with such networks.  
18 Its central offices are state-of-the-art facilities in the heart of 70 major

1 metropolitan areas, which range in size from 50,000 to 550,000 square feet of  
2 equipped floor space. In these locations, Level 3 terminates both local and  
3 intercity fiber networks, as well as locates its high-speed transmission equipment,  
4 routers, and Softswitch equipment. (Softswitch technology bridges the gap  
5 between legacy circuit-switched technology and more advanced IP-based  
6 networks.)

7 Level 3 believes that, while other entities in the communications business — such  
8 as, frankly, Qwest — struggle to adapt to change, Level 3, to quote a former  
9 President, *is* the change.

10 **Q. AT A VERY HIGH LEVEL, WHAT CONSIDERATIONS OF**  
11 **TECHNOLOGY POLICY SHOULD GUIDE THE COMMISSION'S**  
12 **DECISIONS IN THIS CASE?**

13 **A.** From a high-level perspective, I believe that three key technology policies are  
14 embedded in the nation's communications laws and have a direct bearing on this  
15 case.

16 First, at a high level, the Commission should make decisions that encourage  
17 development and deployment of new technology and innovative, new services.  
18 The history of the telecommunications industry is one of sustained — one might

1 even say unrelenting — technical and service-oriented innovation. On some  
2 level, each decision the Commission makes here will either facilitate and  
3 encourage such innovation, or will tend to preserve the *status quo*. The 1996 Act  
4 is not about preserving the *status quo*. It is about bringing new and innovative  
5 services to all segments of the industry.

6 Second, the Commission should promote and encourage the unfettered growth of  
7 the Internet. Section 230 of the Communications Act, and any number of FCC  
8 pronouncements, embody a clear policy to promote the growth and development  
9 of the Internet and consumer access to it. We are now so accustomed to  
10 contacting friends by email, finding information from Google or Yahoo or  
11 MapQuest, and downloading our favorite music from iTunes or RealNetworks,  
12 that it is easy to forget that these and other incredibly useful services and  
13 applications did not just magically appear, and the environment in which they  
14 grew and developed was not some stroke of luck. To the contrary, the wide-open  
15 environment that made these services possible was the result of conscious policy  
16 choices to keep regulation away from the Internet. As Internet applications such  
17 as Voice over Internet Protocol (“VoIP”) services are beginning to make inroads  
18 on incumbents’ businesses, the policy of keeping the Internet unregulated is  
19 coming under increasing assault.

1 Third is to encourage competition in telecommunications markets. The  
2 Commission, therefore, should in each case ask whether deciding for or against  
3 Level 3 would encourage the development of competition. Although on some  
4 level this is an "economic" rather than "technology" policy consideration, in fact  
5 there is an intimate link between promoting competition and promoting the  
6 development and deployment of new technology. Incumbent monopolists have  
7 very little incentive to deploy new technology. New technology disrupts settled  
8 ways of doing things. It requires capital expenditure at the outset even if it saves  
9 money in the long run. People have to be trained in how to best use it. And,  
10 because it is new, it is in some sense inherently risky in that it might not work  
11 entirely as anticipated, it might affect other markets in which the business is  
12 operating, etc. Businesses in general will avoid these "hassles" if they can. A  
13 competitive environment, however, is a situation in which these things cannot be  
14 avoided and where, to the contrary, businesses are forced to invest and innovate in  
15 order to survive and prosper. So, from this perspective, promoting competition is  
16 an important way to promote the development and deployment of new  
17 technology.

18 **Q. HOW DO THESE POLICIES RELATE TO EACH OTHER?**

1 A. While they may conflict in some situations, from the perspective of promoting  
2 technological development, these policies are mutually reinforcing. As just noted,  
3 promoting competition creates an environment in which firms are free to innovate  
4 and deploy new technology. The development and deployment of new and  
5 innovative technology, of course, stimulates and enables competition. And the  
6 flexible, advanced capabilities of the Internet simultaneously depend on and  
7 enable both competition and technical innovation.

8 **Q. AS YOU UNDERSTAND IT, HOW DO THESE POLICY**  
9 **CONSIDERATIONS RELATE TO THE LEGAL AND REGULATORY**  
10 **CONTEXT OF THIS CASE?**

11 A. While I am not a lawyer, I am generally familiar with the provisions of the 1996  
12 Act and FCC rulings relating to telephone competition — both of which have a  
13 strong technology policy component. With that perspective, I would note that  
14 several of the key issues separating the parties relate to interconnection of their  
15 networks, under Section 251(a)(1) and Section 251(c)(2) of the Communications  
16 Act. Section 251(c)(2) requires that terms and conditions of interconnection be  
17 “reasonable.” That is a relatively open-ended standard, so it is helpful to  
18 articulate some specific policy considerations that should guide the Commission  
19 in determining what is and is not “reasonable.”

1 Second, as I understand it, under Section 251(d)(3), the Commission is allowed to  
2 impose requirements regarding interconnection that are not specified in the  
3 federal law, as long as those additional requirements are “consistent with the  
4 requirements of” Section 251. In considering the question of whether a particular  
5 obligation not literally set forth in the Act is “consistent with the requirements” of  
6 Section 251, to understand the policies and objectives that underlie that portion of  
7 the law — which, I believe, the policies articulated above clearly do.

8 **Q. HOW DOES LEVEL 3’S APPROACH TO THE INDUSTRY RELATE TO**  
9 **THE KEY POLICIES AT ISSUE IN THIS CASE, AS YOU HAVE**  
10 **DESCRIBED THEM ABOVE?**

11 A. Level 3’s network embodies innovation and new technology. Its services  
12 facilitate and encourage access to and development of the Internet. And, it  
13 provides competition across a wide spectrum of telecommunications markets.  
14 From Level 3’s perspective, its entire business plan is consistent with, and  
15 dependent on, the pro-technology policies underlying the 1996 Act.

16 **III. ISSUE 2: Combining Different Traffic Types on Interconnection Trunks**  
17

1 **Statement of the Issue:** Qwest wants Level 3 to provision separate trunk groups for  
2 different types of traffic, thus forcing Level 3 to set up duplicate, inefficient trunk  
3 groups to every Qwest end office and tandem office switch.  
4

5 **Q. WHAT IS LEVEL 3'S POSITION ON THIS ISSUE?**

6 A. Level 3 and Qwest should not be required to set up different trunk groups for  
7 different regulatory "types" of traffic. Instead, all types of traffic going from  
8 Level 3 to Qwest (local and toll, interLATA and intraLATA, interstate and  
9 intrastate, "telecommunications service" or "information service," circuit  
10 switched end-to-end or IP-enabled) should be combined on the same trunk group  
11 along a given route. I understand that regulatory rules might require that different  
12 types of traffic be subject to different rating regimes, but that is no reason to  
13 degrade network efficiency by handling technically equivalent traffic in different  
14 ways as a matter of network engineering and architecture. I note in this regard  
15 that Level 3 has agreements with the 3 other RBOCs, covering 39 states and the  
16 District of Columbia that allow for the most network-efficient exchange of all  
17 types of traffic. Qwest is a real outlier on this issue.

18 **Q. WHAT IS QWEST'S POSITION?**

19 A. Qwest wants Level 3 to order and provision multiple, separate trunk groups to  
20 every tandem and end office in the state. They want one set of trunk groups for  
21 local and IntraLATA traffic, and another set of trunk groups for InterLATA

1 traffic. If they will accept IP-enabled traffic at all — which they appear to contest  
2 — they want that on separate trunks too. From an engineering perspective,  
3 setting up all these separate trunk groups for traffic going to and coming from the  
4 same place is grossly inefficient. I submit that it cannot be considered a  
5 “reasonable” condition of interconnection.

6 **Q. WHAT IS A TRUNK?**

7 A. A trunk is a logical connection between two switches, provisioned by means of  
8 physical facilities between those two switches. The physical facility is not the  
9 trunk. It may be any appropriate medium — copper, optical fiber, microwave  
10 radio, coaxial cable, etc. The trunk is the logical path *carried on* the physical  
11 facility. The term “trunk” arises from within the PSTN, so, not surprisingly a  
12 trunk refers to a single voice-grade connection, capable of carrying one voice call  
13 between two switches.

14 **Q. WHAT IS A TRUNK GROUP?**

15 A. A trunk group is a collection trunks, normally (but not necessarily) provisioned  
16 over the same physical facility connecting two switches, configured to operate as  
17 a cohesive unit when delivering multiple voice connections between the two  
18 switches. You can think of the physical facility carrying a trunk group as

1 completely unmarked road — just a wide concrete path between two cities. Each  
2 individual lane that we paint on the highway is a trunk. All the lanes going  
3 together in the same direction are a trunk group. The wider the highway, the  
4 more lanes it has, and the more traffic it can carry.

5 **Q. HOW DO YOU MEASURE THE CAPACITY OF TRUNK GROUPS?**

6 A. A single trunk — that can carry a single voice conversation — is known as a  
7 “DS0.” Putting 24 DS0s together creates a DS1, which is the basic unit of carrier-  
8 to-carrier trunking in the PSTN. Putting 28 DS1s together creates a DS3, which is  
9 equivalent to 672 DS0s. (For historical reasons, there is no “DS2.”) DS0s, DS1s  
10 and DS3s can all be carried on any normal transmission medium (copper, fiber, or  
11 radio).

12 More modern, high-capacity networks exchange traffic using optical fiber  
13 connections. The data-carrying capacity of optical fiber utterly dwarfs the  
14 capacity of copper wires. The smallest normal unit of capacity on an optical  
15 network is an OC-3, which is the equivalent of three DS3s. Other common  
16 capacity measures for optical networks are the OC-12 (12 DS3s), the OC-48 (48  
17 DS3s), and the OC-192 (192 DS3s).

1   **Q.   HOW DO TELECOMMUNICATIONS ENGINEERS DECIDE HOW**  
2       **MUCH CAPACITY TO PUT INTO PLACE BETWEEN TWO**  
3       **SWITCHES?**

4   **A.**   At a very high level, the more traffic that will flow between the switches, the  
5       bigger the trunk group you will put into service. But it is actually more  
6       complicated than that.

7       Think about the highway example discussed above. Imagine that you are trying  
8       to design a highway between a large city and a populous suburb. You would not  
9       look at the number of cars driving between the city and the suburb at 3:00 on  
10      Sunday morning. And, although perhaps not as obvious, you would not just look  
11      at the total number of cars that travel that route over the course of a day or week  
12      or month. Instead, to properly design the highway, you would look at how many  
13      cars are trying to travel that route at the very same time, at rush hour on the  
14      busiest day of the week. That way, you would know how much traffic your new  
15      road will need to be able to handle when it is at its busiest. *That* will tell you how  
16      big to make your highway.

17      This same principle applies to deciding how big to make trunk groups between  
18      switches. Different routes that serve different types of customers have different

1 "rush hours" (called "busy hours" in the telecommunications business). A route  
2 between switches that mainly serve business customers might have a busy hour  
3 between 9:00 and 10:00 a.m. when people arrive at their offices for work. On the  
4 other hand, a route between switches that mainly serve residential customers  
5 might have a busy hour between 3:00 and 4:00 p.m. as children get home from  
6 school and they and their parents start calling each other to discuss homework,  
7 social events, or the evening's plans.

8 There is a final, but critically important, consideration in determining how large  
9 trunk groups should be. This issue is known as "trunking efficiencies."

10 **Q. WHAT DO YOU MEAN BY "TRUNKING EFFICIENCIES?"**

11 A. For reasons which I will briefly explain below, it turns out that, while the number  
12 of trunks that you need in a trunk group to carry a given amount of busy hour  
13 traffic definitely increases as the amount of traffic increases, the number of trunks  
14 goes up at a *slower rate* than the traffic goes up. If the current amount of traffic  
15 is carried on a single DS1 (24 DS0s), it will *not* require three DS1s to carry three  
16 times as much traffic. Instead, it will require, perhaps, only two DS1s. Moreover,  
17 this effect continues as the traffic growth get larger, so that ten times as much

1 busy hour traffic will not require anything near a 10-fold increase in the number  
2 of trunks.

3 In practical terms, this means that carriers can greatly conserve on the number of  
4 trunks they need to establish between two switches, by combining as much of the  
5 interswitch traffic as possible onto a single, large trunk group.

6 **Q. WHAT TRUNKING IS AT DISPUTE IN THIS ISSUE?**

7 A. There are several issues. The first has to do with handling incoming (to Qwest)  
8 interLATA traffic. The bulk of traffic between Level 3 and Qwest is "local"  
9 interconnection traffic. However, Level 3 also has some InterLATA traffic that it  
10 carries for IXC's that must be delivered to Qwest customers. Today, Level 3  
11 routes this traffic to 3<sup>rd</sup> parties (IXCs) for completion to Qwest. These 3<sup>rd</sup> party  
12 IXCs price this service at relatively high rates, causing this to be an expensive  
13 solution for Level 3. Level 3 would like to complete this traffic directly to Qwest.  
14 Unfortunately, Qwest wants to require Level 3 to use separate trunk groups for  
15 this traffic, rather than simply to deliver this traffic on existing interconnection  
16 trunks.

17 **Q. IS LEVEL 3 TRYING TO AVOID PAYING ACCESS CHARGES ON THIS**  
18 **IXC TRAFFIC?**

1 A. Absolutely not. Level 3 agrees that this traffic is subject to access charges, and  
2 has language in its proposed agreement that provides for the payment of those  
3 access charges. However, for the reasons explained briefly above, it would be  
4 technically much more efficient to include this traffic on the same trunk group  
5 that Level 3 uses to deliver "local" traffic to Qwest. That would allow Level 3  
6 (and Qwest) to take advantage of the trunking efficiencies discussed above.

7 **Q. WHAT OTHER TRUNKING ISSUES EXIST BETWEEN LEVEL 3 AND**  
8 **QWEST?**

9 A. Qwest seems reluctant to accept incoming IP-enabled traffic (that is, traffic that  
10 originated by means of a broadband data connection as opposed to a normal  
11 telephone) at all. To the extent that it will accept the traffic, however, it wants  
12 that traffic, too, to be on trunks other than the existing "local" interconnection  
13 trunks. In addition, Qwest may even want separate trunking for some calls from  
14 its customers to ISPs served by Level 3.

1   **Q.   IS THERE ANY TECHNICAL REASON TO REQUIRE SEPARATE**  
2       **TRUNK GROUPS FOR LOCAL, INTRALATA, INTERLATA, ISP-**  
3       **BOUND, AND/OR IP-ENABLED CALLS?**

4   **A.**   No.  Although various kinds of calls might begin in non-PSTN format, or be  
5       transported some or all of the way along their journey in a non-PSTN format  
6       (such as IP-enabled), Level 3 delivers all of its traffic bound for Qwest  
7       subscribers in standard PSTN circuit switched format and standard SS7 signaling,  
8       and receives all traffic from Qwest in that same, standard format.  (As I  
9       mentioned above, one of the capabilities of our softswitches is precisely to do the  
10      necessary conversions from IP to PSTN format and vice-versa).  So, all traffic  
11      coming from Qwest is obviously in normal PSTN format, and by the time we  
12      deliver any this traffic to Qwest, it is all in that same format as well — no matter  
13      what transformations and changes it may undergo at other parts of its journey.

14      Now, not surprisingly, Qwest and Level 3 have some disputes about the proper  
15      charging regime to apply to traffic that might fall into different regulatory  
16      categories.  But no matter how those disputes might turn out, there is absolutely  
17      no technical reason to carry these different regulatory “types” of traffic on  
18      different trunk groups.  Yet, that is what Qwest is proposing to require.

1    **Q.    WOULD IT BE EFFICIENT TO BUILD TWO HIGHWAYS RIGHT NEXT**  
2           **TO EACH OTHER, BOTH GOING TO THE SAME PLACE?**

3    A.    No. One large highway is, obviously, more efficient than two smaller highways  
4           with the same number of lanes. As noted above, car traffic on a highway behaves  
5           in the much the same way as traffic on a telephone network. The same types of  
6           traffic engineering calculations are used to size both. The same types of  
7           congestion, blocking and capacity are common to both. Again, though, that is  
8           what Qwest's language would seem to require.

9    **Q.    WHAT ARE SOME OF THE REASONS WHY A SINGLE LARGE**  
10           **TRUNK GROUP IS BETTER THAN MULTIPLE SMALLER TRUNK**  
11           **GROUPS?**

12   A.    As alluded to above, requiring multiple trunk groups along the same path between  
13           two switches is unnecessary, inefficient, costly, and can harm network  
14           performance. For example, one key problem is that using multiple trunk groups  
15           will lower the blocking Grade of Service (GOS), unless additional trunks are  
16           installed.

17   **Q.    WHY WOULD THE REQUIREMENT FOR SEPARATE TRUNK**  
18           **GROUPS CAUSE LEVEL 3 TO BUILD SEPARATE NETWORKS?**

1 A. To meet the Qwest requirement, Level 3 would need to order, build and provision  
2 multiple trunk groups from the Level 3 switch serving the state to each Qwest  
3 tandem, and over time to each end office. Essentially, Level 3 would need to  
4 build a separate network for each type of traffic that Qwest requires to be split  
5 out. Each separate network would be composed of transport facilities and  
6 switching facilities between the Level 3 switch to all Qwest tandems and  
7 eventually to virtually all Qwest end offices. Over time, this would require  
8 needless duplication of both transport and switch facilities, for both Level 3 and  
9 Qwest.

10 **Q. WHY IS THIS INEFFICIENT?**

11 A. From a network point of view, it is always preferable to combine as much traffic  
12 as possible on single trunk groups. Large single trunk groups are much more  
13 efficient than multiple smaller trunk groups. For example, one trunk group with  
14 four DS1s will handle much more traffic than two trunk groups, each with two  
15 DS1s. To handle the same amount of traffic, the two trunk groups would need to  
16 contain 3 DS1s each to have the same capacity. This would require a total of six  
17 DS1s to do the same job as four DS1s on one trunk group. "Breakage" of a single  
18 trunk group into multiple trunk groups always requires additional trunks to carry  
19 the same traffic load with the same blocking grade of service.

1    **Q.    EARLIER YOU MENTIONED “BLOCKING GRADE OF SERVICE.”**  
2           **WHAT DOES THAT TERM REFER TO?**

3    A.   Blocking Grade of Service (“GOS”) is the measure of call blocking on a trunk  
4           group. Blocking is generally measured at the busy hour and is given as a percent  
5           of the calls that are blocked due to insufficient trunk capacity. A standard,  
6           acceptable blocking GOS would be 2% end-to-end. This means that for every  
7           100 calls that customers try to make that would be carried on that route, group,  
8           two calls will be blocked due to insufficient capacity. When 2% call blocking is  
9           desired end-to-end, an allocation is made to various facilities and equipment to  
10          achieve the 2%. Typically, a trunk group between two switches is allocated 1%  
11          blocking level so that 2% can be maintained end-to-end. This is due to the fact  
12          that many calls involve more than one switch and thus more than one trunk group.  
13          There are also small probabilities of blocking on digital loop carrier equipment  
14          and associated loop transport. (Within the traditional PSTN, you would know that  
15          you had encountered blocking on a trunk group when you heard a “fast busy”  
16          signal, or a recording telling you that “all circuits are busy.”)

17   **Q.    WHAT IS THE IMPACT ON BLOCKING GOS WHEN A LARGE**  
18           **AMOUNT OF TRAFFIC MUST BE BROKEN DOWN INTO MULTIPLE**  
19           **TRUNK GROUPS?**

1 A. If a large trunk group (say, 48 DS0s, or 2 DS1s) is split into multiple trunk groups  
2 with the same total size (two groups of 1 DS1 each), the overall carrying capacity  
3 of the multiple smaller trunk groups is smaller than the carrying capacity of the  
4 original one trunk group. The laws of trunk engineering dictate that the total  
5 number of trunk members in multiple trunk groups must be significantly larger in  
6 order to carry the same amount of traffic. The effect is like congestion on the  
7 highway. One four-lane highway will carry considerably more traffic than two, 2-  
8 lane highways. For example, a single trunk group with 48 members (two DS1s)  
9 can carry about 15% more traffic than two trunk groups with 24 members each.

10 **Q. IS THERE ANOTHER TYPE OF INEFFICIENCY WITH RESPECT TO**  
11 **SPLITTING A LARGE TRUNK GROUP INTO MULTIPLE SMALLER**  
12 **TRUNK GROUPS?**

13 A. Yes. Earlier I mentioned "breakage." This term is used to describe the problem  
14 when facilities with discrete sizes must be divided into smaller facilities. As I  
15 noted earlier, the DS1 (24 DS0s, or 24 simultaneous calls) is the smallest normal  
16 unit in which trunks between switches are ordered and provisioned. This is  
17 because the DS1 is the most common size of "port" on switching and transport  
18 equipment. This makes the practical effect of the inefficiencies of breaking a  
19 large trunk group down into two or more smaller trunk groups even worse.

1 For example, suppose that if a trunk group needs a total capacity of 30 DS0  
2 trunks. Because trunks are ordered and provisioned in DS1 units, two DS1s must  
3 be used (that is, 48 DS0s). Even though the need is only for 6 DS0s above the  
4 first DS1, two complete DS1s will be established, because the switching and  
5 transport gear accepts trunk groups in DS1-sized “chunks.”

6 Now, if this trunk group must be divided to handle two different call types on two  
7 different trunk groups, it is quite possible that the ratio between the two call types  
8 is not 50/50. If the trunk requirement is larger than a multiple of 24 (even if it is  
9 only one trunk member larger – say 25 DS0s) a new DS1 must be provisioned and  
10 the associated equipment added to terminate the new DS1. Coupled with the need  
11 for additional capacity to maintain the same blocking GOS, this leads to  
12 significant increases in the overall number of DS1s needed for a given traffic  
13 volume when the trunk groups must be split. Taking this factor and the blocking  
14 factor into account, one trunk group with 48 members cannot be replaced with  
15 two trunk groups of 24 members. To get the same blocking grade of service using  
16 two trunk groups, both trunk groups would need to have two DS1s. So the effect  
17 of splitting the large trunk group into two is actually to *double* the total number of  
18 DS1s needed — to carry the *exact same amount of traffic!*

1   **Q.    WHAT COST ELEMENTS ARE ADDED TO THE NETWORK WHEN**  
2       **MULTIPLE SEPARATE TRUNK GROUPS MUST BE MAINTAINED?**

3    A.   In physical terms, to establish a DS1 trunk group between two switches requires,  
4       essentially, the following. First, each switch must be programmed to separately  
5       identify the traffic bound for the particular trunk group and to direct that traffic to  
6       the appropriate “port” on the switch. Second, there must actually *be* a trunk port  
7       (a separate physical device) available on the switch to accommodate the new DS1  
8       trunk group. The capacity of switches to accommodate new trunk ports is limited;  
9       at some point it is necessary to add new switch modules (that contain more ports)  
10      in order to add new trunk groups, and, for any given switch, at some point the  
11      total number of ports is reached and the only way to establish a new trunk port is  
12      to add a new switch.

13      The same holds true for the transmission medium (in Level 3’s case, typically  
14      optical fiber) used to carry a DS1 trunk group between Level 3 and Qwest. The  
15      DS1 trunk physically runs from the Level 3 switch to a device known as a digital  
16      cross-connect system (DCS) – which has its own DS1 ports and port-capacity  
17      limits – and then on to the fiber optic terminal (FOT) that actually sends and  
18      receives the laser signals used to convey information over optical fiber. The FOT  
19      also has its own DS1 ports and port-capacity limits. Adding DS1s, therefore,

1       sooner or later requires the purchase of additional trunk ports on switches, DCSs,  
2       and FOTs, eventually requiring that these devices be "grown" or that new  
3       switches, DCSs, and/or FOTs be purchased. Obviously, over time this will  
4       greatly increase the capital requirements of operating the network.

5       Finally, although obviously much of the operation of a modern  
6       telecommunications network is automatic, behind the scenes a large number of  
7       people are required to monitor, maintain and operate the system. Provisioning  
8       and maintaining additional trunk groups and the resultant facilities requires  
9       additional staff time as well.

10      From Level 3's perspective, when it is necessary to incur these costs due to  
11      growth in traffic volume, we of course do so. But at the same time, if it is *not*  
12      necessary to incur these costs in order to carry a given volume of traffic, we  
13      obviously do not want to do so. This is why the issue of using efficient trunking  
14      arrangements is so important to Level 3, and why we believe that it is entirely  
15      unreasonable to allow Qwest to require that traffic be broken down into multiple,  
16      smaller trunk groups if there is no technical reason for doing it.

1   **Q.    WOULD QWEST FACE THE SAME INEFFICIENCIES FROM**  
2       **MULTIPLE TRUNK GROUPS THAT YOU HAVE DESCRIBED ABOVE**  
3       **FOR LEVEL 3?**

4    A.   Yes. Just like Level 3, Qwest would need to dedicate DS1 ports on its FOTs,  
5       DCSs, and switches to the additional DS1 trunk groups made necessary by  
6       inefficient, multiple trunk groups.

7   **Q.    WHY WOULD QWEST WANT TO IMPOSE SUCH INEFFICIENCIES**  
8       **ON ITSELF?**

9    A.   I obviously can't say for sure. That said, it is well known among  
10       telecommunications engineers that traffic is migrating off the traditional landline  
11       PSTN. Some normal voice traffic is just "disappearing" as end users  
12       communicate via email and instant messaging, rather than making telephone calls  
13       at all. Some PSTN voice traffic is migrating to wireless, as people use their cell  
14       phones to make calls that would otherwise have been made over the landline  
15       network. Some PSTN voice traffic (although not as much as Qwest might want  
16       the Commission to believe, at least in the short run, as Mr. Gates describes) is  
17       migrating to VoIP services such as those offered by Vonage or Skype. Unless  
18       Qwest had perfect foresight, it is quite possible that it overestimated its own needs  
19       for capacity and could well have over-invested in switch, DCS, and/or FOT

1 capacity. (Of course, since Level 3 is a relatively new and still-growing carrier,  
2 Level 3 is not sitting around with excess capacity on its switches, FOTs, etc.  
3 Level 3 has to spend capital dollars to meet growing demand.) In that situation,  
4 Qwest might see it as advantageous to *require* a competitor like Level 3 to use an  
5 inefficiently large number of trunks. If Qwest already has the excess capacity on  
6 hand — which it would, if total demand for its services was shrinking — then it  
7 could impose large capital and other costs on Level 3, with little or no new cost to  
8 itself, simply by convincing this Commission that there was some reason to  
9 require multiple, inefficient trunk groups.

10 **Q. ARE THERE STILL OTHER POTENTIAL PROBLEMS WITH QWEST'S**  
11 **PROPOSAL?**

12 A. Yes. Taking essentially the reverse of the situation described above, if Qwest  
13 does *not* have excess capacity, Qwest might actually not be able to add the  
14 necessary trunk ports in a timely fashion. This would put an effective limit on the  
15 rate at which Level 3 could grow and make competitive inroads in the market. At  
16 least from the perspective of the industry as a whole, this is not hypothetical. As I  
17 understand it, in a case within the last year or so, the FCC found that Verizon had  
18 violated the Communications Act by reason of having insufficient capacity to  
19 permit interconnection with a competitor (Core Communications) to grow. If a

1 true industry giant like Verizon did not invest in enough capacity to handle  
2 growth in interconnection requirements, it is of course possible that Qwest would  
3 be in the same position.

4 **Q. WILL THERE BE ANY INCREASE IN MISROUTED CALLS IF**  
5 **“LOCAL,” “TOLL,” AND OTHER “TYPES” OF ARE CARRIED ON A**  
6 **SINGLE, LARGE TRUNK GROUP?**

7 A. No, not at all. Briefly, to determine how to route a call, the switches looks at the  
8 first six digits of the telephone number (the “NPA-NXX”). Part of the human  
9 staff effort described above in administering trunk groups is properly  
10 programming the switch to know that, if the NPA-NXX of the called number on  
11 an outgoing call is “602-222,” the call gets routed to “Trunk Group XX,” but if  
12 the NPA-NXX is “602-555,” the call gets routed instead to “Trunk Group YY.”

13 Of course, in actual practice it’s a bit more complicated than that. For example, if  
14 the called number has been ported from its original carrier to a competing carrier,  
15 the switch doesn’t look at the NPA-NXX of the number that was actually *dialed*,  
16 it looks at the “NPA-NXX”-equivalent portion of the “Location Routing  
17 Number,” or LRN. And, if the NPA-NXX in question is subject to “thousands-  
18 block pooling,” it will be necessary to look not only at the first six digits of the

1        number (the NPA-NXX), but also at the seventh digit — essentially, the NPA-  
2        NXX-X — as well.

3        But the point is that none of this activity involved in routing a call outbound from  
4        Qwest to Level 3, or vice versa, is affected in any way by any regulatory overlay  
5        that classifies a call as “local” or “toll” or “intraLATA” or “IP-enabled” or “ISP-  
6        bound” or “interstate” or “intrastate.” What matters is the dialed number or, for  
7        ported numbers the LRN. The rest of the regulatory stuff has literally no impact  
8        at all on call routing.<sup>1</sup> The network will have no trouble correctly routing any  
9        type of calls, no matter how many are combined on the same trunk group. While  
10       there will always be some small numbers of misrouted calls in the network, this  
11       number will not increase when these traffic types are combined on the same trunk  
12       group.

13    **Q.    DOES COMBINING DIFFERENT REGULATORY “TYPES” OF**  
14    **TRAFFIC (SUCH AS LOCAL AND ACCESS TRAFFIC) ON THE SAME**

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<sup>1</sup> In fact, even if there is a regulatory requirement to treat some class of traffic differently for *routing* purposes, such a requirement is basically impossible to implement unless the requirement can be translated into handling calls with different NPA-NXXs differently. For example, that’s how interLATA calls are routed to a customer’s presubscribed long distance carrier. Originating ILEC switches contain a list of NPA-NXXs that are “local” to the switch contained in their programming, along with a particular trunk port assigned for outgoing calls to each “local” NPA-NXX. If a customer dials an NPA-NXX that is not on that list, either the call will be sent to the customer’s presubscribed IXC or, in areas where “1+” dialing is required for toll calls, directed to a recording saying that the call “cannot be completed as dialed” or some similar message.

1           **TRUNK GROUP RESULT IN AN INCREASE IN THE POSSIBILITY OF**  
2           **FRAUD OR INTENTIONAL MISROUTING OF CALLS?**

3    A.    No. Any company can intentionally misroute calls to perpetrate fraud, whether or  
4           not traffic is combined on a single trunk group. Dishonest carriers can change the  
5           SS7 call identification information to make access traffic appear to be local traffic  
6           if they so choose. This can be done whether the traffic is put on separate trunk  
7           groups or on a single trunk group. Level 3 always pays the appropriate access  
8           charges for access traffic and has no intention of changing call information or  
9           inappropriately routing calls to avoid access charges. But requiring separate trunk  
10          groups to prevent so-called "call laundering" is no more useful or effective than it  
11          would be to require banks to provide one copy of everyone's bank statement on  
12          plain white paper, and then an extra copy on special yellow-and red-stripped paper,  
13          be to prevent "money laundering." You can establish such a requirement —  
14          obviously at an increased cost — but doing so has nothing to do with preventing  
15          the problem at issue.

16   **Q.    PLEASE DESCRIBE THE PROCESS BY WHICH PROPER BILLS FOR**  
17   **INTERCARRIER COMPENSATION ARE DEVELOPED.**

18   A.    Normally billing for intercarrier compensation is accomplished in several stages.  
19          First, the SS7 signaling network transmits data about an incoming call, such as the

1 identification of the carrier delivering the call, the calling number, the dialed  
2 number, the LRN if the dialed number has been ported, etc. The switch receiving  
3 the traffic generates a record, known as an "AMA" record in traditional PSTN  
4 circuit switches, that records this information, along with other information such  
5 as the time (to the second) that the call starts and stops, perhaps the specific trunk  
6 on which the call was received, and other switch-specific information. These  
7 "AMA" records are then processed through what is known as a "mediation"  
8 system into industry-standard "EMI" (or "electronic message interchange")  
9 records. The EMI record basically takes the AMA or equivalent data and puts it  
10 into an industry-standard format (sometimes known as a "CDR," or "call detail  
11 record"). These records are then run through a billing system that applies  
12 programmed logic to the data in the records to determine whether, how much, and  
13 who to bill.

14 This process normally occurs on a call-record-by-call-record basis. So, it doesn't  
15 actually matter, for LEC-to-LEC traffic exchange, whether the traffic on a given  
16 trunk is subject to different charging regimes or the same; each call is (or can be)  
17 rated individually.

1   **Q.    IS THAT THE WAY ALL CARRIERS ACTUALLY BILL FOR THIS**  
2       **TYPE OF TRAFFIC EXCHANGE?**

3   **A.**   No. First, some carriers have less capable mediation or billing systems than  
4       others, so not all carriers are capable of performing the call-by-call review.  
5       Another carrier might have a bill-and-keep arrangement with respect to much or  
6       all of the traffic exchanged with interconnected LECs, and so not need to go  
7       through the call-by-call process. Second, carriers can establish a Percent Local  
8       Use (PLU) and Percent Interstate Use (PIU) for calls on a trunk group, updating  
9       the information periodically to assure that it is correct. Basically, instead of  
10      reviewing the call-by-call data on a monthly basis for billing, all or a sample of a  
11      month's traffic is reviewed periodically to determine what percent of traffic falls  
12      into which billing category. In this regard, Level 3 has offered to track the  
13      Percent of IP Use (PIPU) to measure the percent of IP-Enabled traffic that is  
14      exchanged between the parties.<sup>2</sup> This information can be audited if there is any  
15      doubt as to its validity. These two methods are being used today by various  
16      CLECs and ILECs to manage the combining of different traffic types on trunk  
17      groups.

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<sup>2</sup> See Intercarrier Compensation Sections 3.2.2.4 -3.2.2.5, Issue IC-2. See Intercarrier Compensation Sections 3.2.2.4 -3.2.2.5, Issue IC-2.

1   **Q.    HOW DOES LEVEL 3 PROPOSE TO CALCULATE THE PLU FACTOR?**

2   A.    I describe the process in detail below in Section   XI of this testimony,  
3        "Determination of Traffic Types." This process is being used by Level 3 in all of  
4        the Bell South states, SBC states, and Verizon states, and similar processes are  
5        used by other CLECs with the ILECs.

6   **Q.    HAVE OTHER COMPANIES DEALT WITH THE BILLING ISSUES**  
7       **ASSOCIATED WITH COMBINING DIFFERENT TYPES OF TRAFFIC**  
8       **ON INTERCONNECTION TRUNKS?**

9   A.    Yes. Other CLECs have been using factors in many states for more than five  
10        years. Several IXC's with CLEC affiliates combine different traffic types on FGD  
11        trunks with Qwest, using PLU to handle carrier billing. These IXC's started off  
12        with an FGD network for the purpose of exchanging intrastate and interstate  
13        access traffic. As their business strategy changed and these carriers decided to  
14        enter the local market, they made use of the FGD network that was already in  
15        place to handle the exchange of all their traffic. Similarly, Level 3 started out with  
16        a "local" network established for the purpose of exchanging "local" traffic. As  
17        described above, there is no technical or "billing"-related reason that Level 3  
18        should not be able to use those same trunks for terminating FGD and other types  
19        of traffic. In this regard, the distinction between local and toll services is fast

1 disappearing. Level 3's customers are demanding packaged services that include  
2 the termination of intrastate and interstate access traffic. Level 3 would like to be  
3 able to make most efficient use of the network that is already in place today.  
4 Qwest and Level 3 will be able to do so if Qwest is required to allow the  
5 exchange of all traffic over the existing "local" trunks.<sup>3</sup>

6 **Q. DOES QWEST USE A PLU FOR DISTINGUISHING LOCAL AND**  
7 **INTRALATA TOLL TRAFFIC ON INTERCONNECTION TRUNKS?**

8 A. Yes. That is, Qwest already permits the combination of local and intraLATA toll  
9 traffic — normally subject to different charging regimes — on a single trunk  
10 group, and uses PLU factors for determining how many minutes are subject to  
11 access charges and how many are subject to reciprocal compensation. In other  
12 words, even quest allows mixed traffic on the same trunk group today. To  
13 distinguish the traffic that is subject to reciprocal compensation from the traffic  
14 that is subject to intrastate access, it provides on a quarterly basis, a PLU factor to  
15 the terminating carrier. Likewise, it expects any carrier originating traffic that  
16 terminates to Qwest to provide a PLU factor to Qwest. It is neither technically

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<sup>3</sup> Qwest calls these "LIS" trunks, for "Local Interconnection Service," but that is actually a misnomer. Qwest and Level 3 are co-carriers; although each is responsible for the transport and termination of traffic delivered by the other, Qwest is not providing Level 3 a "service" in the normal sense, any more than Level 3 is providing Qwest a "service." Rather, in order for each carrier to provide full "service" to its respective customers, the two carriers enter into interconnection arrangements.

1 challenging nor in any way unreasonable to extend that process to include a PIU  
2 or other factors to determine the distribution of traffic among whatever different  
3 regulatory traffic "types" might end up existing under our final contract.

4  
5 **Q. HAS LEVEL 3 AGREED TO SEND ONLY "LOCAL" TRAFFIC TO**  
6 **QWEST'S "LOCAL ONLY" TANDEM SWITCHES?**

7 A. Yes. Most Qwest switches are currently carrying both local and toll traffic.  
8 These switches can easily handle trunk groups that carry both local and toll  
9 traffic. Where Qwest has a tandem switch that currently only handles local  
10 traffic, however, as an accommodation, Level 3 has agreed to send only local  
11 traffic to such switches. However, I would emphasize that Level 3 agreed to this  
12 not because it thinks this is good network engineering. To the contrary, for all the  
13 reasons discussed above, it is not sensible to separate traffic into different types  
14 and trunk groups if not required. Because the amount of affected traffic is small  
15 in this case, however, Level 3 chose not to continue to dispute with  
16 Qwest on this topic in the limited circumstance of "local only" tandems.

1   **Q.   HAS LEVEL 3 AGREED NOT TO SEND TOLL TRAFFIC THAT**  
2       **DOESN'T TERMINATE TO QWEST END USERS OR UNE/RESALE**  
3       **CUSTOMERS TO QWEST END OFFICE SWITCHES?**

4   **A.**   Yes.   Qwest has told Level 3 that it expects difficulty with Independent  
5       Telephone Companies ("ITCs") and other CLECs that expect to receive recording  
6       data from the Qwest tandem switch when an IXC terminates traffic to such other  
7       carrier's through Qwest's network. Because Qwest has chosen to configure its so-  
8       called "LIS" trunks without the same recording capabilities as FGD trunks have,  
9       Qwest will not be able to provide such data to these carriers. This would create a  
10      situation in which these 3<sup>rd</sup> party LECs would receive traffic as to which they  
11      would legitimately be entitled to charge access rates, but as to which they would  
12      have inadequate information to actually render an access bill. To avoid this  
13      situation, for the relatively limited amount of IXC traffic that Level 3 will deliver  
14      to Qwest for further delivery to ITCs or other CLECs, Level 3 has agreed to send  
15      such traffic only to Qwest's toll tandems where adequate recordings for the 3<sup>rd</sup>  
16      parties can be made. Again, Level 3 is making this accommodation to Qwest  
17      because its impact is relatively small. The fact that we are doing so does not  
18      mean that it would be sensible to generally carve out different types of traffic for  
19      separate trunking, for all the reasons discussed above.

1

2    **Q.    QWEST STATES THAT LEVEL 3 MUST DESIGN ITS**  
3       **INTERCONNECTION TO COMPORT WITH QWEST'S EXISTING**  
4       **NETWORK AND NOT INTERCONNECT IN A MANNER THAT RISKS**  
5       **EXHAUSTING QWEST TANDEMS. ARE THESE STATEMENTS**  
6       **JUSTIFIED?**

7    A.    Qwest is completely wrong to suggest that Level 3 is or should be required to  
8       design any part of its network to mirror, match, duplicate, or conform to Qwest's  
9       network design. Put aside the fact, as discussed above, that Level 3 is a new  
10      carrier without any need (yet) for a ubiquitous network such as Qwest's; and put  
11      aside the fact that Level 3's customer base differs from that of Qwest, which  
12      would lead to a different network design. The fact is that network technology has  
13      changed so much since Qwest started deploying its network in Arizona that if  
14      *Qwest* were building a new network today, to serve its own existing customer  
15      base, *Qwest itself* would not re-generate the same network that it actually has  
16      today. It makes no engineering or technical sense to suggest that there is anything  
17      sacrosanct, or even particularly efficient or optimal, about Qwest's existing  
18      network. There is not.

19

1 Now, that said, Qwest does have a legitimate technical concern that neither Level  
2 3 nor any other interconnected carrier should deliver such large amounts of traffic  
3 to Qwest's tandem that the capacity of the tandem itself would be overloaded. It  
4 is standard practice in the circuit-switched telephone industry to establish direct  
5 trunks between switches when the level of traffic between them exceeds a certain  
6 level. Given this, Level 3 is perfectly willing to work with Qwest to avoid the  
7 problem of tandem overload by jointly engineering separate trunk groups that go  
8 directly between Level 3 and those Qwest end offices with enough traffic to  
9 justify the direct trunking. These are known in the industry as "Direct End Office  
10 Trunks," or DEOTs.

11  
12 **Q. DOESN'T ESTABLISHING DEOTS LEAD TO THE CREATION OF**  
13 **MULTIPLE TRUNK GROUPS, WHICH YOU HAVE TESTIFIED ABOVE**  
14 **ARE INEFFICIENT?**

15 A. To a certain extent, yes. However, all network engineering involves making  
16 tradeoffs. There is, to coin a phrase, no such thing as a free lunch. While looking  
17 at trunking alone, it is more efficient for both Qwest and Level 3 to connect their  
18 networks with a single, massive trunk group from Level 3 to Qwest's tandem, that  
19 requires that all traffic between the parties be switched by Qwest twice, once at

1 the end office, and once at the tandem. In addition, it requires Qwest to make use  
2 of three trunk ports for all traffic between the networks: one at the "Level 3" side  
3 of Qwest's tandem, to accept incoming traffic and send outbound traffic to Level  
4 3; another at the "Qwest Network" side of Qwest's tandem, to connect the tandem  
5 to trunks bound for particular end offices; and then a third trunk port at the end  
6 office itself, to connect that end office to the tandem. With DEOTs, even though  
7 the total number of trunks will be higher than would be the case in a single  
8 massive trunk group, Qwest is able to avoid the use of tandem switching and to  
9 cut down on the total number of trunk ports it has to use. Level 3 is certainly  
10 willing to work with Qwest to permit Qwest to obtain those network efficiencies.

11 **Q. GIVEN THESE TECHNICAL CONCERNS WITH ESTABLISHING**  
12 **MULTIPLE TRUNK GROUPS ALONG THE LINES QWEST IS**  
13 **SUGGESTING, HOW DO THE KEY TECHNOLOGY POLICIES YOU**  
14 **IDENTIFIED EARLIER IN YOUR TESTIMONY RELATE TO THE**  
15 **QUESTION OF ESTABLISHING MULTIPLE TRUNK GROUPS TO THE**  
16 **SAME QWEST SWITCH OR SWITCHES?**

17 **A.** From a high-level policy perspective, on this issue, Qwest is trying to drag Level  
18 3 back into the past. Level 3 proposes to deliver traffic to each Qwest switch on a  
19 single, efficient, combined trunk group. Qwest, however, is not concerned about

1 technical efficiency. Instead, because it thinks that different kinds of traffic fall  
2 into different regulatory buckets, it wants those types of traffic sent on separate  
3 trunk groups. This is anticompetitive, because, as described above, it will impose  
4 needless costs on Level 3. It is also contrary to the development and  
5 encouragement of new services, in that it forces Level 3 to classify traffic in  
6 accordance with the old, existing service classifications with which Qwest seems  
7 most comfortable. And, particularly in the case of VoIP traffic (addressed  
8 below), the inefficiencies imposed by Qwest's suggested requirement of separate  
9 trunking for different "types" of traffic will act to directly suppress the  
10 development of this exciting Internet-based innovative service.

11 **Q. IN ORDER TO BE PERFECTLY CLEAR, HOW DOES THE ISSUE OF**  
12 **ESTABLISHING SEPARATE TRUNK GROUPS FOR DIFFERENT**  
13 **TYPES OF TRAFFIC RELATE TO THE QUESTION OF ESTABLISHING**  
14 **NEW, PHYSICAL POINTS OF INTERCONNECTION — THAT IS, NEW**  
15 **TRANSMISSION FACILITIES — BETWEEN LEVEL 3 AND QWEST?**

16 **A.** As noted above, physical transmission facilities and trunk groups are two different  
17 things. One way to look at it is to consider a physical highway running between  
18 two cities. Looking just at the one city-to-city route, the transmission "facility" is  
19 the physical slab of concrete and asphalt that the cars and trunks will drive on.

1       Setting up a trunk group is analogous to drawing lane lines on the concrete,  
2       indicating that some lanes are for traffic going northbound, some for traffic going  
3       southbound, some for trucks only, some for passenger cars only, etc.

4       As between two communications networks, a single, high-capacity fiber optic  
5       facility between the two networks can easily contain dozens of different trunk  
6       groups. One trunk group might be traffic directed to the ILEC tandem. Another  
7       trunk group might be traffic directed to a specific ILEC end office switch. Still  
8       another trunk group might carry traffic bound for the ILEC's operator service  
9       network. But whatever might lead the carriers to establish different trunk groups  
10      (such as traffic bound for different switches), that is a totally separate question  
11      from any need to establish different physical facilities linking the carriers'  
12      networks. The idea behind setting up a physical "meet point" between two  
13      networks is that each carrier is responsible for all the switching, transmission and  
14      related facilities on its side of the meet point. The two carriers then cooperate  
15      with each other to establish whatever trunk groups need to be established, *carried*  
16      *over that meet point interconnection facility.*

17      Given this, it is important to recognize that the establishment of separate direct  
18      end office *trunks* does not at all mean that it makes sense to establish any separate

1        *facilities* linking Level 3 with Qwest end offices. To the contrary, the *facilities* to  
2        carry the trunks from the Qwest tandem location (where Level 3 will normally  
3        physically interconnect in a LATA) to the affected end office already exist; they  
4        are the same facilities (normally optical fiber) that carry the traffic from the  
5        tandem to the end office before the DEOT is established. The new DEOT trunk  
6        group will ride the same fiber optic interconnection facility between Qwest and  
7        Level 3 that all other traffic rides, at the parties' single POI in the LATA.

8        All that said, it makes no sense at all to suggest, as Qwest does, that putting local,  
9        toll, or other types of traffic on a single combined trunk group will risk exhausting  
10       Qwest tandems in any way. What avoids exhausting Qwest's tandem is  
11       establishing DEOTs to carry *all* the traffic from Level 3 to a Qwest end office on  
12       an efficient basis. Level 3 is willing to do this. Simply provisioning several  
13       inefficient trunk groups of separate "types" of traffic to Qwest's tandem will not  
14       only not help with tandem exhaust, it will cause the tandem to exhaust its trunk  
15       port capacity more rapidly than keeping the different types of traffic together in  
16       the same trunk group. Again, the solution to tandem exhaust is DEOTs — which  
17       separate traffic out based on *destination switch* — not separate trunk groups for  
18       different "types" of traffic.

1   **Q.   HOW DO THE KEY TECHNOLOGY POLICIES YOU IDENTIFIED**  
2       **EARLIER IN YOUR TESTIMONY RELATE TO THE PROSPECT OF**  
3       **LEVEL 3 BEING REQUIRED TO ESTABLISH ADDITIONAL**  
4       **PHYSICAL POIs — THAT IS, ADDITIONAL PHYSICAL**  
5       **TRANSMISSION FACILITIES BETWEEN LEVEL 3 AND QWEST?**

6   **A.**   Each of the three pro-technology policies identified above supports allowing  
7       Level 3 to interconnect by means of a single POI until and unless Level 3 itself  
8       believes additional POIs are needed. For this issue, the primary policy is the  
9       promotion and encouragement of competition. Although Level 3, as noted above,  
10      has invested billions of dollars in its advanced, fiber-optic, IP-based network, that  
11      does not mean that it can or should be called upon to mirror or duplicate the local  
12      network architecture of the ILECs with which it interconnects and competes. To  
13      the contrary, it would be extraordinary to conclude that a competitor like Level 3  
14      would have any rational interest in duplicating the incumbent's network  
15      architecture.

16      The essence of Level 3's local business plan is to identify customers with high  
17      levels of Internet-based communications, either incoming, outgoing, or both, and  
18      provide highly efficient links for such customers both "upstream" to the Internet  
19      itself and "downstream" to the PSTN. Level 3 has no independent business

1 reason — and certainly no engineering reason — to try to re-create Qwest's local  
2 network architecture. Instead, what Level 3 primarily needs from Qwest in order  
3 to serve its customers is efficient, seamless interconnection between Level 3's  
4 network and Qwest's network. It seems plain that efficient interconnection of this  
5 type will be degraded if Level 3 is subject to regulatory obligations to establish  
6 multiple physical interconnections with Qwest, above and beyond those that are  
7 necessary to Level 3's business and that Level 3 will put into place itself.

8 As I note elsewhere in my testimony, Level 3 is not averse to establishing  
9 multiple physical points of interconnection in a LATA when traffic levels and  
10 other factors so warrant; but **requiring** Level 3 to interconnect at multiple points  
11 on Qwest's network really boils down to punishing Level 3 — in the form of  
12 needless mandated capital expenditures — for not having the same network, the  
13 same customer base, and the same business plan as Qwest. This is contrary not  
14 only to the policy of encouraging competition, but also to the policy of  
15 encouraging the deployment of new, innovative services and network  
16 architectures.

17 Clearly, as a policy matter, Qwest is simply wrong in insisting that Level 3 should  
18 have to establish more than one physical POI within a LATA.

1   **Q.     WHAT IS LEVEL 3 ASKING THIS COMMISSION TO DECIDE ON THIS**  
2       **ISSUE?**

3   **A.**    Level 3 is asking this Commission to rule that Qwest must allow Level 3 to use  
4           single interconnection trunk groups between the carrier's switches instead of  
5           multiple trunk groups, using PLU, PIU and PIPU for carrier compensation and  
6           billing purposes. This will preserve network efficiency, maintain reasonable call  
7           blocking standards, and minimize the trunking and switching equipment both  
8           parties need for interconnection. The language that Level 3 is proposing for this  
9           issue is fair and balanced and will allow the efficient use of trunks by both  
10          companies.

11   **IV.    ISSUE 5: ESP Traffic - VoIP Traffic**

12   **Statement of the Issue:** Whether QWEST may prohibit Level 3 from utilizing local  
13   interconnection facilities to terminate Internet-enabled traffic, specifically for VoIP  
14   traffic.<sup>4</sup>  
15

16   **Q.     WHAT IS INTERNET-ENABLED TRAFFIC?**

17   **A.**    Internet-Enabled traffic is meant to be a broader term for Enhanced Service  
18          Provider (ESP) traffic. Internet-Enabled traffic includes VoIP and other forms of

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<sup>4</sup> The following paragraphs in the agreement are covered by the testimony in this issue: Interconnection Trunking Requirements Appendix, Section 13.1, Inter-carrier Compensation, Sections 3.1, 4.5, 4.7-4.7.2.1, 7.1, 7.2, 16.1. DPL Issues ITR 19; IC 1, 4, 8, 9, 14.

1 enhanced communications capabilities made possible by the Internet and IP  
2 technology.

3 **Q. WHAT IS THE INTERNET?**

4 A. The Internet is an open-ended, network of networks that allows virtually anyone  
5 with a computer and a high speed or low speed link to connect to anyone or any  
6 business in the world. Historians debate about when the Internet really began. It  
7 had its roots in the 1970s and 1980s with research, government and business  
8 networks. The "Internet" as such was opened to the public for commercial  
9 purposes around 1995. The Internet has grown quickly in less than a decade to  
10 include hundreds of millions of computers worldwide and has become a major  
11 factor in the global economy.

12 **Q. HOW DOES THE INTERNET DIFFER FROM THE PSTN?**

13 A. The PSTN is a closed network, controlled by large telephone companies,  
14 including ILECs, ICOs, IXC's, CLECs and CMRS operators. Access to the PSTN  
15 is through a variety of equipment such as dial-up phones, PBXs and more lately  
16 cordless phones and cellular phones. All terminal devices on the PSTN must be  
17 connected through a switch controlled by one of the phone companies. In fact, to  
18 be "on" the PSTN basically means that you have a telephone number assigned by

1 one of the entities noted above. That telephone number is, in effect, a “network  
2 address” on the PSTN.

3 In contrast to the PSTN, the Internet is comprised of (among other things)  
4 hundreds of thousands of routers and switches owned by tens of thousands of  
5 different companies. Routers and switches with new networks attached are added  
6 to the Internet every day. Anyone who abides by the standards and protocols used  
7 on the Internet can set up a new network and connect themselves or their  
8 customers to the Internet without any detailed application process or regulatory  
9 scrutiny.

10 **Q. WHAT IS VOICE OVER INTERNET PROTOCOL, OR VoIP?**

11 A. One of the basic protocols of the Internet is called “IP,” which means (sensibly  
12 enough) “Internet Protocol.” Another basic protocol is called “TCP,” or  
13 “Transaction Control Protocol.” There are many, many protocols that work with  
14 these basic protocols to define how the Internet performs various functions.  
15 These include SMTP (Simple Mail Transfer Protocol, used for email); FTP (File  
16 Transfer Protocol, used to allow the retrieval of files from remote locations);  
17 HTTP (Hyper-Text Transfer Protocol, used for transmitting web pages and  
18 establishing web links); and many others. All of these different protocols rely on

1       the basic TCP/IP protocols to permit different applications (email, file transfer,  
2       world-wide web, etc.) to function on the Internet.

3       Voice over Internet Protocol, or VoIP, refers to various specific protocols that use  
4       the basic TCP/IP system to treat voice communications like any other Internet  
5       application. With VoIP, telephony signals, including voice signals, are digitized  
6       and transmitted as packets to their destination, just as with an email, streaming  
7       video, or any other kind of IP transaction. While the PSTN, as noted above, was  
8       designed with a laser-sharp focus on one thing — delivering voice calls — the  
9       Internet focuses equally sharply on something very different — delivering data  
10      packets, no matter what those data packets might represent. This means that  
11      while the PSTN treats data as some unusual thing that requires special treatment,  
12      the Internet treats all data the same — even if the data in question happens to  
13      represent a voice call. As a result, the Internet essentially destroys the old  
14      distinctions between “voice” and “data” that are a standard part of PSTN thinking.

15      Indeed, because the information associated with any particular application is  
16      broken down into packets of bits and does not re-assume its original form (i.e.  
17      sound, text or pictures) until it is reassembled at the terminating end, it is virtually  
18      impossible to assign the transmission of packets to any particular service

1 classification at any point other than origin or destination. An IP network  
2 provider, for example, can be carrying real-time two-way voice packets without  
3 actually offering voice service to any end-user customer.

4 When a VoIP call starts with a computer or with some device on a broadband data  
5 network (such as a DSL line or a cable modem service), and then is delivered to  
6 the PSTN, the protocol, or format, of the transmission has clearly and  
7 fundamentally changed. Specifically, a net protocol conversion is required to  
8 convert the packetized IP data into the Time Division Multiplexed (TDM) signal  
9 that is used on the PSTN. Today, VoIP applications come in many forms. Some  
10 resemble traditional phone service, from the point of view of the end user, more  
11 than others. But the application as a whole clearly entails changing the form (and  
12 perhaps even the content) of the signals at issue. As I understand the relevant  
13 regulatory classifications, this means that VoIP is properly viewed as an  
14 "information service" rather than a "telecommunications service."

15 **Q. IS VoIP, AS FACILITATED BY LEVEL 3, A TELECOMMUNICATIONS**  
16 **SERVICE?**

17 A. No. Level 3 performs many functions for its various customers. For example,  
18 Level 3 is a CLEC that performs telecommunications functions for its customers

1 — transmission of traffic between points specified by the customer; assigning  
2 telephone numbers and switching calls to and from them, etc. But the service that  
3 Level 3 provides to VoIP entities is a translation or protocol conversion service  
4 that allows communications between end users of the PSTN and the Internet.  
5 This service enables customers to have oral communications over the Internet that  
6 may seem to be the similar to ordinary telephone calls, but in fact are very  
7 different. Access to Level 3-provided VoIP is through high-speed data lines, not  
8 phone lines with phone numbers; and the terminal equipment is not a telephone,  
9 but a computer or computer phone. In this regard, the PSTN itself is not  
10 compatible or interoperable with the Internet. Frequently, communications from  
11 end users *to* the Internet are carried by means of PSTN services — this happens  
12 every time a customer dials up a connection to his or her ISP. But the only way  
13 that the PSTN can be actually *connected* to the Internet in any meaningful sense  
14 is by means of a protocol conversion of the signal from Time Division  
15 Multiplexing (TDM) on the PSTN to Internet Protocol (IP) for the Internet. Level  
16 3 does a net (or complete) protocol conversion from TDM to IP to enable VoIP  
17 users to communicate with the end users of PSTN services.

1    **Q.    WHAT IS NET PROTOCOL CONVERSION?**

2    A.    Net protocol conversion occurs when the media stream that uses one protocol,  
3           native to one particular type of network, is converted into a different media stream  
4           using a different protocol on a different type of network. In the case of VoIP, a  
5           voice call originating on the PSTN using TDM must be converted to IP by  
6           packetizing the data, generating the Internet protocol and sending out the result on  
7           the packet network.

8    **Q.    IS NET PROTOCOL CONVERSION NECESSARY ON VoIP CALLS**  
9       **BETWEEN LEVEL 3 AND QWEST?**

10   A.    Absolutely. All VoIP calls that begin with a Level 3 customer and terminate to a  
11           Qwest customer require a net protocol conversion. Likewise, calls that begin with  
12           a Qwest customer and terminate to a Level 3 customer also require a net protocol  
13           conversion. The reason for this is simple. Level 3 has no PSTN-like, TDM-  
14           using, circuit switches on its network. Any and all media streams generated by  
15           Level 3 will originate in an IP format and must be converted to TDM for  
16           terminating on the PSTN. The reverse is also true. A call originating from a  
17           Qwest end user (on the Qwest network) must be converted to IP in order for Level  
18           3 to move the signal through its network. In this regard, Level 3 has had to  
19           backwards-engineer its network to be able to facilitate the conversion from TDM

1 based services offered on the PSTN to IP based services offered Level 3's (and  
2 others') next generation networks. Finally, Level 3 receives and terminates  
3 services to its ESP customers in an IP format – the media originated in TDM on  
4 the PSTN is *not* converted back to TDM by Level 3 before hand-off to its ESP  
5 customers. Thus, a net protocol conversion occurs – media streams go from IP to  
6 TDM or vice versa depending on whether Level 3 originates or terminates the  
7 call.

8 **Q. DOES NORMAL CELLULAR TELEPHONY REQUIRE A PROTOCOL**  
9 **CONVERSION?**

10 A. No. The cell phone uses modulation and compression techniques in the over the  
11 air channel (from the cell phone's antenna to the cell site's antenna), but there is  
12 no protocol conversion at the cell site. The signal is demodulated and decoded as  
13 any radio signal would be. The cell phone and cell site are merely using an  
14 efficient means of radio communication. The cell site operates in the TDM  
15 domain and is part of the Public Switched Telephone Network. This is quite  
16 distinct from the protocol conversion that occurs between the IP domain and the  
17 TDM domain.

1   **Q.    WHAT TYPE OF CUSTOMER PREMISES EQUIPMENT IS NEEDED**  
2       **FOR VoIP?**

3   A.   VoIP requires specialized Customer Premises Equipment (CPE). Standard Touch  
4       Tone or dial pulse phones will not work on a VoIP network, unless they  
5       themselves are connected to a computer or similar device that *can* handle VoIP  
6       format. Special phones, called “SIP” phones (“SIP” stands for “Session Initiation  
7       Protocol,” and is another Internet-related protocol like FTP, SMTP, and HTTP)  
8       can be used for VoIP. These phones have small computers built into them that  
9       packetize the voice data and generate SIP messages. Computers with headsets  
10      and microphones can also be used for VoIP.

11   **Q.    CAN A VoIP CUSTOMER MOVE HIS OR HER SIP PHONE OR**  
12       **COMPUTER PHONE TO DIFFERENT LOCATIONS, WHILE STILL**  
13       **MAINTAINING THE SAME PHONE NUMBER?**

14   A.   Yes. A SIP phone or computer phone can be plugged into any broadband  
15       connection to receive VoIP service. The end user could send and receive calls  
16       from any location with this type of broadband connection. This gives VoIP users  
17       a degree of mobility that is not available to users of PSTN service. This type of  
18       mobility is coming to be known in the industry as a “nomadic” service, in order to

1 distinguish it from more traditional "mobile" service of the kind provided by  
2 normal wireless phones.

3 **Q. IS THERE CURRENTLY ANY WAY TO DETERMINE WHERE A VOIP**  
4 **USER IS LOCATED WHEN THEY MAKE A CALL?**

5 A. No. At present, the geographic location of a VoIP user is indeterminate. They  
6 can take a computer from one location to another and make VoIP calls in either  
7 location. Since the "telephone number" is resident in the computer terminal or  
8 SIP phone, the calling number is the same whether the device is located in  
9 Minnesota or Arizona. Of course, as one might imagine, an indeterminate  
10 location makes it challenging for VoIP services to function properly in connection  
11 with location-based E911 services. The VoIP industry is working on this issue,  
12 and the FCC recently required VoIP services that use normal telephone numbers  
13 and that meet certain other criteria to find a way to supply "normal" 911  
14 capabilities to their users.

15 **Q. CELLULAR TELEPHONES CAN BE USED IN ANY LOCATION. DO**  
16 **CELLULAR PROVIDERS AND ILECS HAVE THE SAME PROBLEM**  
17 **WITH GEOGRAPHIC LOCATION AS VoIP SERVICE?**

1 A. No. The location of a cell phone user is always known within a pretty small  
2 geographic area. The cell phone registers with all cell sites that are nearby and  
3 service is provided by a particular cell site that has a definite location. So if a cell  
4 phone user travels from a home location in Minnesota to a location in Arizona,  
5 the cell phone system will automatically "know" that they are in Arizona and not  
6 Minnesota when they make a call. This is fundamentally different from the VoIP  
7 situation, where the geography of a call is not known by the ESP that provides the  
8 service or carrier that completes the call. Indeed, the broadband service provider  
9 to which a VoIP user connects his or her SIP phone in most cases probably has no  
10 idea that the packets going back and forth to that particular node on the network  
11 represent voice communications as opposed to email, web site traffic, or any other  
12 Internet activity.

13 **Q. PLEASE DESCRIBE THE LEVEL 3 FIBER AND IP NETWORKS.**

14 A. Level 3 has a large all fiber-optic backbone network that connects 68 markets in  
15 the U.S. and 17 markets in Europe, with over 16,000 route miles of fiber in the  
16 US intercity network and 3600 route miles in Europe. Exhibit RRD #1 shows the  
17 current configuration of the Level 3 fiber network that is installed and operational  
18 in the US. Riding on this Fiber Backbone, Level 3 maintains a large IP network  
19 that it manages as a separate network, composed of high-speed links and core

1 routers. Exhibit RRD #2 shows the current configuration of Level 3's IP network.  
2 The Level 3 IP backbone is run as a private network and is connected to the  
3 public Internet via hundreds of peering arrangements at Level 3 Gateways,  
4 located in 29 metropolitan areas.<sup>5</sup> Level 3 central office facilities are state-of-the-  
5 art facilities in the heart of 70 major metropolitan areas. As noted earlier, these  
6 facilities range in size from 50,000 to 550,000 square feet of equipped floor space.  
7 This is where both local and intercity fiber networks terminate, where high-speed  
8 transmission equipment is situated, and where routers and Softswitch equipment  
9 is located.

10 **Q. IS LEVEL 3 A FACILITIES BASED CARRIER IN ARIZONA?**

11 A. Yes. Level 3 has fiber facilities in Arizona as well as Points of Interconnection  
12 (POIs) with Qwest. Exhibit RRD #3 shows the fiber route, fiber regeneration  
13 facilities, POIs and serving areas in Arizona.

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<sup>5</sup> Peering arrangements, as used here, refer to locations at which Level 3 exchanges traffic with other providers of Internet connectivity. Suppose an end user connected to an ISP that uses Level 3 for its Internet connectivity seeks to download information from a web site that is hosted by an ISP that uses some other entity (say, UUNet) for its Internet connectivity. For the information to get from the UUNet network to the Level 3 network, there must be connections between them. That is what the peering arrangements are.

1   **Q.    HOW HAS THE LEVEL 3 NETWORK BEEN OPTIMIZED FOR IP?**

2   A.    The Level 3 network was designed as a high-speed packet network for carrying IP  
3        traffic. It is composed of IP routers instead of PSTN type switches, and all of its  
4        facility links are IP-based.

5   **Q.    WHAT IS THE BASIC DIFFERENCE BETWEEN THE PSTN AND**  
6       **LEVEL 3'S IP BASED NETWORK?**

7   A.    As noted above, the PSTN was designed to carry voice traffic. The PSTN is  
8        made up of circuit switches and facilities linking them that carry circuit-based  
9        phone traffic. The Level 3 IP network is a data network, not a voice network. It  
10       is made up of IP routers and IP data links between the routers.

11   **Q.    WHAT TYPES OF CUSTOMERS DOES LEVEL 3 SERVE AND WHAT**  
12       **TYPES OF SERVICES DO THEY USE?**

13   A.    Level 3 serves ESPs and ISPs, a subset of ESPs. ISPs require local connectivity  
14        to the PSTN and transport and termination services from Level 3, including  
15        modem banks and collocation space. ESPs and ISPs use the Level 3 network to  
16        pass all types of data, including email, web download services, computer-to-  
17        computer data transfer, VoIP and other streaming media. Level 3 also serves

1 cable companies, DSL providers some large enterprise companies and other  
2 carriers with transport and termination of VoIP and TDM traffic.

3 **Q. DO LEVEL 3 CUSTOMERS NEED LEVEL 3 TO PROVIDE THEM WITH**  
4 **THE ABILITY TO RECEIVE TRAFFIC FROM THE PSTN AND TO**  
5 **ORIGINATE TRAFFIC BOUND FOR THE PSTN?**

6 A. Yes. Traditional ISPs need to receive dial-up modem access from the PSTN.  
7 Though high-speed service from cable and DSL is becoming increasingly  
8 popular, there are still a great number of customers who utilize dial-up modems to  
9 access the Internet from the PSTN, in part because the costs of high-speed access  
10 to the edge of the network are still too expensive for many customers. Many  
11 Qwest customers today call Level 3's ISP customers for dial up Internet service.  
12 Level 3's VoIP customers today need Level 3 to complete calls to Qwest end  
13 users and to receive calls from Qwest end users bound for Level 3's customers'  
14 end users.

15 **Q. CAN YOU GIVE A GENERAL DESCRIPTION OF WHAT HAPPENS**  
16 **WITH A VoIP CALL?**

17 A. Exhibit RRD #9 shows a high level depiction of a VoIP connection. In this  
18 example an end user sitting at a VoIP terminal requests a connection to a Qwest

1 customer. The VoIP terminal uses a broadband connection to access a VoIP  
2 Feature Server ("FS"). The VoIP terminal and the FS negotiate features and  
3 functionality, giving the user a wide variety of options. The VoIP terminal  
4 initiates signaling protocol that is passed through the FS, through the Level 3 IP  
5 network, and on to the Level 3 Softswitch and SS7 Gateway. The Level 3 SS7  
6 Gateway turns the SIP messages into SS7 messages and thru the SS7 Signaling  
7 Transfer Points ("STP") passes them on to the Qwest network, where appropriate  
8 trunking is negotiated. When this call set up has been completed, the VoIP phone  
9 begins passing packetized voice data to the Level 3 IP network. The Level 3 IP  
10 network sends the packets on to the Level 3 Media Gateway ("MG"), which  
11 completes a net protocol conversion on the packetized voice to turn it into Time  
12 Division Multiplex (TDM) signals that are recognized by the Qwest trunks and  
13 switches. The Qwest switch sends the call on to the Qwest end user. In this  
14 example voice type data is passed between the end users.

15 **Q. DOES THE QWEST NETWORK NEED TO TERMINATE VoIP CALLS**  
16 **IN A MANNER THAT IS DIFFERENT FROM THE TERMINATION OF**  
17 **NORMAL PSTN BASED LOCAL TELEPHONE CALLS?**

18 A. Qwest terminates VoIP calls to its end users in the same manner they would use  
19 to terminate regular PSTN based local calls to their end users. There are no extra

1 processes, no additional transport, and no additional switching. This is possible  
2 because Level 3 itself has already done the work of converting the IP-format data  
3 stream into a TDM-format circuit-switched voice call that Qwest's network is  
4 capable of recognizing and handling.

5 **Q. HOW DO THE KEY ISSUES OF TECHNOLOGY POLICY THAT YOU**  
6 **DISCUSSED EARLIER IN YOUR TESTIMONY RELATE TO THE ISSUE**  
7 **OF VoIP CALLS?**

8 A. At a high level, VoIP is an innovative Internet application that turns the voice-  
9 centric world of the PSTN on its head by treating voice communication as just  
10 another data-oriented application on the worldwide Internet. From a long-run  
11 industry perspective, it represents the triumph of data networks over voice  
12 networks. While the PSTN can provide only a limited, low-bandwidth form of  
13 data communications (basically, dial-up access to the Internet at 56 kilobits per  
14 second), the Internet can do everything the PSTN can do, and more. In my view,  
15 it is only a matter of time before the entities that comprise and operate the PSTN  
16 convert to IP-based communications, as indeed, Qwest and other PSTN entities  
17 are already beginning to do.

1 One of the features of the Internet is that distance and location are largely  
2 irrelevant. As the FCC has noted, the contents of a single web page can come  
3 from a variety of different servers in a variety of different locations. Most of us  
4 familiar with modern business travel have learned that our email can reach us  
5 anywhere, either downloaded to a computer in a hotel room by means of now-  
6 ubiquitous broadband connections offered by business hotels, or to wireless  
7 devices such as a Blackberry.

8 VoIP is an Internet application first and a voice application second. By this I  
9 mean that VoIP partakes in the distance-insensitive, location-insensitive  
10 characteristics of Internet applications. No matter what telephone number might  
11 be assigned to a VoIP customer (if any number is assigned at all), the customer  
12 might be participating in a call from next door or from around the world.

13 It is obviously challenging from a regulatory perspective to figure out what to do  
14 with VoIP traffic. The FCC has a number of ongoing proceedings trying to sort it  
15 out. But one thing is clear: whatever VoIP is, it is not traditional "telephone toll  
16 service," where the end user makes a call from some fixed location, completes it  
17 to some distant location, and is charged a separate toll charge for the privilege. In  
18 both economic and technical terms, VoIP calling is *sui generis*.

1 In these circumstances, the choice between assessing traditional access charges or  
2 lower and more economical reciprocal compensation rates on this traffic should  
3 actually be very clear. This is a new and innovative service that we should all  
4 want to encourage. That means that we should impose the lowest reasonable  
5 charges on it, when it needs to interface with the PSTN. That means that as a  
6 policy matter this traffic should be subject to reciprocal compensation rates, not  
7 access charges.

8 Basically, all three of the policies I articulated at the beginning of my testimony  
9 point to this same conclusion. Permitting VoIP traffic to be terminated at  
10 reciprocal compensation rates will encourage competition. VoIP is exactly the  
11 kind of new and innovative service that we should be trying to encourage, so it  
12 should not be subject to high access charges when lower reciprocal compensation  
13 rates provide adequate compensation to Qwest. And, VoIP is the latest innovative  
14 service to arise from the Internet, which should be encouraged for independent  
15 policy reasons. As a policy matter, therefore, VoIP traffic should be subject to  
16 reciprocal compensation, not access charges.

1    **XI.    Determination of Traffic Types**

2    **Q.    WHAT ISSUES MUST BE RESOLVED FOR THE PROPER**  
3    **DETERMINATION OF TRAFFIC TYPES?**

4    A.    First, in order to efficiently combine traffic on single interconnection trunk  
5    groups, a Percent Local Use must be calculated to determine traffic types for  
6    billing. Second, Qwest is proposing a new, technically infeasible method of  
7    determining whether traffic is local or toll.

8    **Q.    HOW DOES LEVEL 3 PROPOSE TO CALCULATE THE PLU, PIU AND**  
9    **PIPU FACTORS?**

10   A.    Level 3 maintains local calling area tables as does Qwest. Over a given period of  
11   time, Level 3 can collect all call data on calls exchanged between the parties.  
12   Once this data is collected Level 3 will, per industry standard, calculate and report  
13   the Percent Interstate Usage (PIU). The remaining traffic is a combination of  
14   local and Intrastate traffic. Level 3 will then once again compare the remaining  
15   call data with call tables and from this calculation determine the PLU as the  
16   percent of local traffic compared to the percent of intrastate traffic. So, by first  
17   determining the percentage of interstate traffic from the total traffic and then  
18   determining the local traffic from the remaining traffic, you end up with the traffic  
19   that is intrastate toll and the traffic that is local. For IP-Enabled traffic, Level 3

1 will create a Percent IP Use (PIPU) for both originating and terminating traffic.  
2 This will allow Qwest and Level 3 to properly compensate each other for IP  
3 traffic. Alternatively, Level 3 has proposed to attach an Originating Line  
4 Identifier (OLI) code to the call record to identify calls that originate as IP-  
5 Enabled traffic.

6 **Q. WHAT IS LEVEL 3'S PROPOSAL FOR THE USE OF THE OLI FIELD**  
7 **IN THE IDENTIFICATION OF IP-ENABLED TRAFFIC?**

8 A. The OLI field is part of the SS7 protocol. It is currently used to identify calls  
9 from payphones, from prisons and for other purposes. Level 3 would like to use  
10 the OLI field to identify IP-Enabled traffic. It is reasonable to assume that IP-  
11 Enabled traffic may be handled differently for purposes of compensation over  
12 time; thus, the companies need a way to identify IP-Enabled calls. Level 3 can  
13 identify IP-Enabled calls and can set a unique identifier in the OLI field for each  
14 IP-Enabled call. This would help Qwest to identify the traffic if they so choose.  
15 Level 3 is offering to mark the OLI field for each IP-Enabled call so that Qwest  
16 can track IP-Enabled traffic.

17 **Q. IS THERE A DISPUTE OVER THE USE OF THE OLI FIELD FOR THE**  
18 **IDENTIFICATION OF IP TRAFFIC?**

1 A. There is currently no guideline or standard that calls for the use of the OLI field in  
2 SS7 messages for the identification of IP traffic, though this is one of the  
3 mechanisms that is being reviewed nationally. Qwest is reluctant to commit to  
4 the use of the OLI field, and a particular identifier, before national guidelines are  
5 set. Level 3 believes the OLI field is an excellent way to identify IP traffic.

6 **Q. IS THERE PRECEDENT IN THE INDUSTRY FOR USING OPTIONAL**  
7 **SS7 FIELDS OR UNUSED IDENTIFIERS BEFORE NATIONAL**  
8 **GUIDELINES ARE SET?**

9 A. Yes, there is precedent in the industry for carriers to agree on the use of optional  
10 or unused SS7 fields and codes and billing format fields and codes for legitimate  
11 business uses. SBC, for example, does this in many areas of billing, where they  
12 have customized billing formats for their own purposes and now ask carriers who  
13 exchange bills with them to use the customized formats with the optional fields.  
14 For example, my understanding is that SBC wants CLECs to use what are known  
15 as "Category 92/99" records. The use of Category 92/99 records is entirely  
16 unique to SBC's Southwest region.

1 **Q. IF LEVEL 3 PROVIDES QWEST WITH PIPU FACTORS FOR THE**  
2 **COMPENSATION OF IP TRAFFIC, IS THERE ANY NEED FOR THE**  
3 **IDENTIFICATION OF IP TRAFFIC WITH THE OLI FIELD?**

4 A. Not really. The use of PIPU will allow the companies to correctly compensate  
5 each other for IP traffic without the use of the OLI field. The OLI field identifier  
6 for IP traffic is only needed if the companies want to track every IP call. The  
7 PIPU factor makes such identification unnecessary.

8 **Q. CAN LEVEL 3 ACCURATELY CALCULATE THE PLU, PIU AND PIPU?**

9 A. Yes. The calculation of PLU, PIU and PIPU is accurate and can be used for  
10 billing purposes on traffic that is originated by Level 3. Qwest can perform the  
11 same calculations on the calls that it originates. Level 3 can create PIPU for both  
12 originating and terminating traffic, as is discussed below in our proposed contract  
13 language.

14 **Q. DOES BELLSOUTH HAVE A PROCEDURE FOR ADMINISTERING**  
15 **PLU WITH LEVEL 3 AND OTHER CLECS?**

16 A. Yes. BellSouth has agreed to allow Level 3 to combine different traffic types on  
17 interconnection trunks, and they have established a procedure for administering

1 the PIU and PLU. I am including the Bell South procedure for PLU below for  
2 comparison:

3 PLU – Percent Local Usage

4 This factor is the percentage of intrastate terminating usage that is categorized as  
5 Local Jurisdiction. For purposes of this guide the total intrastate usage includes  
6 intrastate local usage and intrastate non-local usage. The local jurisdiction is  
7 applicable to Competitive Local Exchange Carriers (CLECs) that are terminating  
8 local traffic from their network to the BellSouth network. CLECs that totally  
9 utilize resale or unbundled network elements to provision local services are not  
10 required to report PLU factors. Interexchange Carriers that do not terminate local  
11 traffic as a CLEC are not required to report PLU factors. The local jurisdiction is  
12 normally defined per Local Interconnection contractual agreements and is  
13 calculated as follows where MOUs are billed minutes of use: *Total Local MOUs*  
14 *[divided by] Total Intrastate MOUs*. The total intrastate minutes can be  
15 determined by multiplying the total minutes by (1- PIU). Therefore the PLU may  
16 also be calculated as follows:

17  
18 
$$\text{Total Local MOUs [divided by] (Total MOUs) x (1-TPIU)}$$

19 This factor is calculated on a statewide basis by Access Carrier Name  
20 Abbreviation (ACNA).

21 **Q. DOES LEVEL 3 HAVE CONTRACT LANGUAGE THAT IT IS**  
22 **PROPOSING FOR THE CALCULATION OF PLU, PIU AND PIPU AND**  
23 **FOR THE TRANSMISSION AND ASSURANCE OF ACCURACY OF**  
24 **THESE MEASURES?**

25 A. Yes, Level 3 is proposing contract language for definition and calculation of PLU,  
26 PIU and PIPU as well as language for the transfer and verification of these traffic  
27 factors on a monthly basis. That language is contained in Level 3's proposals for  
28 Section 7 of the Interconnection Agreement.

1   **Q.   DO THESE CONTRACT PROVISIONS ADEQUATELY CODIFY THE**  
2       **ACCURATE COLLECTION OF DATA, CALCULATION OF FACTORS,**  
3       **EXCHANGE OF FACTORS AND VERIFICATION BY THE PARTIES**  
4       **THAT IS NECESSARY FOR PROPER BILLING OF CALLS?**

5   **A.**   Yes. I am not an attorney, but I can read and use the English language. Based on  
6       a review of the attached contract provisions, it seems clear that they spell out the  
7       responsibilities of Level 3 in generating accurate factors and Qwest's right to  
8       verify and audit the results. By using these procedures, the companies can bill  
9       each other for access charges and reciprocal compensation for all types of traffic  
10      flowing over the interconnection trunks.

11   **Q.   HOW DO THE TRAFFIC CALCULATIONS WORK WHEN**  
12      **INTERCONNECTION TRUNKS CARRY LOCAL, INTRALATA,**  
13      **INTERLATA AND IP TRAFFIC?**

14   **A.**   The calculation of factors is spelled out in the language contained in Traffic data  
15      is collected for one month. When the traffic is evaluated to calculate the factors,  
16      first the IP-Enabled traffic is taken out and its percentage calculated. The Level 3  
17      network can determine whether an originating or terminating call is IP-Enabled or  
18      not by looking at how the calls is originated or terminated (end points can be  
19      certified as IP or TDM). When the call is IP originated the SIP signaling will

1 reflect that, and one of the SS7 call set up message parameters (OLI) is set to a  
2 particular value (65) to flag the call as enhanced to Qwest. From this process  
3 PIPU is tabulated. Next, interstate traffic is separated from intrastate traffic by  
4 calculating the PIU factor. This is done by examining call records against a  
5 database that can tell whether the calling number and the called number are in the  
6 same state. Phone numbers are traditionally associated with a geographic area  
7 (rate center). Rating of TDM based services is done based on the geographic  
8 assignment of the phone numbers. If the terminating phone number is associated  
9 with a rate center that is outside of the state that the originating phone number is  
10 associated with, then the call is rated as interstate and the call counts towards the  
11 calculation of PIU. Finally, the PLU factor is calculated on the remaining traffic  
12 by using a state specific database that looks at whether the calling number and the  
13 called number are associated with rate centers in the same applicable local calling  
14 area. This is a simplified description of the process that is used to put traffic in  
15 the correct buckets for proper compensation. The creation of PLU and PIU  
16 factors is a process that is done throughout the industry. Level 3 is leading the  
17 industry in the ability to create the PIPU factor.

18 **Q. IS THERE A BASIC DISPUTE BETWEEN QWEST AND LEVEL 3 ON**  
19 **HOW TO DETERMINE WHETHER TRAFFIC IS "LOCAL"?**

1 A. Yes. As I understand it there is a fundamental disagreement between the parties  
2 with respect to what traffic is properly characterized as "local" and what is not. I  
3 recognize that there are legal and policy aspects to this disagreement. However, I  
4 will relate the technical aspects of this dispute.

5 That said, the dispute is basically this: Level 3 contends that since the only thing  
6 the PSTN "knows" about a call is the originating and terminating telephone  
7 number, the status of traffic as "local" should be determined based on the  
8 geographic area associated with the telephone numbers of the calling and called  
9 parties. Qwest, by contrast, seeks to change that traditional arrangement and to  
10 attempt to assess the status of a call as "local" or not based on the actual physical  
11 location of the calling and called parties.

12 **Q. WHAT IS QWEST'S POSITION ON HOW TO CHARACTERIZE**  
13 **TRAFFIC AS "LOCAL" OR NOT?**

14 A. As noted, Qwest maintains that the definition of a local call should be changed to  
15 reflect the geographic location of both the calling and called party premises as  
16 opposed to the originating and terminating phone numbers that have traditionally  
17 been used.

1    **Q.    DOES LEVEL 3 AGREE WITH THIS NEW METHOD?**

2    A.    No. There are a number of technical problems with the method that Qwest is  
3    promoting.

4    **Q.    HAS THE CUSTOMER PREMISES LOCATION BEEN THE**  
5    **DETERMINING FACTOR IN THE DEFINITION OF A LOCAL CALL IN**  
6    **THE PAST?**

7    A.    No. As I described above in connection with routing calls, the PSTN uses the  
8    calling party's number and the called party's number to determine if a call is a  
9    local call.

10   **Q.    DO LOCAL SWITCHES KNOW THE LOCATION OF THE PARTIES**  
11   **WHEN A CALL IS MADE?**

12   A.    No. Circuit switches have no way of knowing the geographic location of the  
13   calling or called party end user. The switch is programmed with a list of which  
14   numbers are "native" to its area and treats calls to and from such numbers  
15   accordingly (i.e., it routes them on trunks to other switches to which it is  
16   connected, based on the NPA-NXX dialed). Calls that it recognizes as "toll" are  
17   routed to the caller's presubscribed IXC. Older circuit switches have a limited  
18   geographic range within which it can serve end users and maintain its quality

standards. Before Local Number Portability (“LNP”) and number block pooling, a process by which 10,000 number NPA-NXXs blocks are divided across multiple carriers and switches in increments of 1000 number blocks (NPA-NXX-X) to make more efficient use of numbering resources, each phone number assigned from a given circuit switch fairly reasonable correlated to the geographic location of the end user. This is simply because the phone number can only be assigned to end users within that limited geographic range from the circuit switch. With the introduction of newer technology switches, soft-switches and now VoIP those distance limitations are fading, phone numbers can be assigned to end users anywhere within the country or world, and switches have no way of knowing the geographic location of the end user.

**Q. HOW ARE CALLS ROUTED IN THE PSTN?**

A. Local calls are routed between switches according to the routing tables in each switch. Depending on the number dialed (putting aside number portability), a switch either handles a call entirely on its own (such as a call between next-door neighbors); or it sends the call off to some other switch by routing it outbound on a particular trunk port. Toll calls — that is, calls carried by IXC — are routed according to the Local Exchange Routing Guide (LERG). The LERG is a database that identifies switches and numbers associated with those switches,

1 based on the NPA NXX codes of the North American Numbering Plan (NANP),  
2 as well as specific physical locations at which traffic bound for particular switches  
3 may be delivered. Thus, for example, in the normal course within the PSTN, the  
4 LERG would indicate that a call to a number within the "602" NPA should be  
5 delivered to a particular carrier, at a particular location in Arizona. Which carrier  
6 and which location will depend on the "NXX" of the dialed number. Switches  
7 within a local calling area know which numbers are associated with the local  
8 calling area and which numbers are not.

9 **Q. SO CALLS BETWEEN TWO LOCAL NUMBERS ARE TREATED AS**  
10 **LOCAL CALLS?**

11 A. Yes. As noted above, each end office switch has a table of NPA-NXXs that the  
12 particular switch views as "local." For all such NPA-NXXs, the switch has to  
13 make only one decision: "Is this call 'mine' or do I need to send it to some other  
14 switch?" If the dialed number "belongs" to the originating switch, as noted  
15 above, the call stays there. But if the dialed number "belongs" to some other  
16 switch, the only thing the originating switch needs to know is which trunk port to  
17 send the call out on.

1 Note that, from this network perspective, the only truly "local" calls are calls that  
2 begin and end in the same physical switching device. Long ago, however, retail  
3 local calling plans grew to include customers served by many different switches.  
4 As a result, what constitutes a "local" call for a retail customer is not really a  
5 technical matter at all. It is simply a retail, marketing decision by the originating  
6 carrier. From a technical perspective it is essentially an arbitrary decision which  
7 NPA-NXXs to include on the programmed list of "local" calls and which to  
8 exclude (which means, usually, that the customer has to dial a "1" before the  
9 NPA-NXX-XXXX in order to complete the call).

10 **Q. FROM A TECHNICAL NETWORK PERSPECTIVE, IS THERE ANY**  
11 **LIMITATION ON THE DISTANCE THAT A "LOCAL" CALL CAN**  
12 **TRAVEL, THE SIZE OF A "LOCAL" CALLING AREA, OR THE**  
13 **NUMBER OF CUSTOMERS IN A "LOCAL" CALLING AREA?**

14 **A.** None at all. And, in fact, the size and scope of "local calling areas" varies greatly  
15 from place to place around the country. Some states have large local calling  
16 areas; others have small local calling areas. Again, from this perspective, the  
17 technical network personnel have no basis to care one way or another. The  
18 carrier's marketing and/or regulatory personnel just have to tell the engineers  
19 which NPA-NXXs to include on the "local" list for any given switch. The

1       originating switch does not "care" (in the sense of doing anything at all  
2       technically different) where it is actually sending a "local" call to a number served  
3       by some other switch; and the terminating switch does "care" (in the same sense)  
4       where a "local" call is coming from. These are retail marketing questions, not  
5       technical questions.

6   **Q.   HOW WOULD SWITCHES IMPLEMENT THE QWEST IDEA OF USING**  
7       **THE GEOGRAPHIC LOCATION AS THE DETERMINATION FOR A**  
8       **LOCAL CALL?**

9   A.   I have no idea. A switch has no way of storing information regarding the  
10       premises location associated with a phone number assigned to that switch, and no  
11       way of receiving or storing information about the premises location assigned to a  
12       phone number calling someone served by that switch. The SS7 protocol that  
13       sends information between switches for call set-up and billing purposes does not  
14       have any parameters to identify the premises locations of calling or called parties.  
15       I have asked engineers that have worked in switch design for 25 years and no one  
16       has ever heard of a feature that would store the geographic location associated  
17       with a phone number in the switch or in any peripheral that is accessible by a  
18       switch. If Qwest were to design such a feature in a peripheral device, it would no

1 doubt be expensive to implement since each call would need to reference a  
2 database, and the database itself would need to be created and maintained.

3 As I pointed out above, moreover, the status of any given call as "local" or not is  
4 an arbitrary marketing-oriented retail choice, not anything that affects or is driven  
5 by any relevant network technology. So, from my network engineering  
6 perspective, it seems to me that Qwest, by pressing its premises-location-based  
7 notion of what constitutes a "local" call, is just trying to impose its own retail  
8 marketing choices onto Level 3. There is certainly no technical basis for Qwest's  
9 position that I can see.

10 **Q. EVEN IF THE SWITCHES, OR AN OUTBOARD DATABASE, COULD**  
11 **UTILIZE CUSTOMER LOCATION INFORMATION, HOW WOULD**  
12 **THIS INFORMATION BE UPDATED AND KEPT CURRENT?**

13 A. Today, local routing tables must be updated in the switches when a new NXX  
14 code is activated in a rate center. This updating is a labor-intensive process, but  
15 fortunately is only needed when new codes are required. The thought of  
16 managing and updating a database that would hold each customer's geographic  
17 location is daunting. Instead of dozens of changes per year there would be  
18 hundreds of thousands in a large LATA. Each time a customer moved in or out of

1 a house or apartment the database would need to be changed, and each carrier  
2 would have changes for each of their customers who moved.

3 **Q. WHAT IS FOREIGN EXCHANGE (FX) SERVICE?**

4 A. FX is a service that has been offered by phone companies for many years. The  
5 service allows an end user to be assigned a phone number from a switch that  
6 serves a different local calling area than the one in which they are located. This  
7 allows customers in the calling area from which the FX number is assigned to call  
8 the FX customer without incurring toll charges. On the other hand, if the FX  
9 customer's next-door neighbor called, it *would* be a toll call. In traditional FX  
10 service, the customer pays the providing carrier for an arrangement (a special  
11 trunk or other facility) that connects them to the switch covering the distant area,  
12 a.k.a. "foreign exchange". The customer is assigned a phone number out of a  
13 switch in the distant area so that end users in that foreign local calling area can  
14 call them by dialing a local phone number. FX numbers have been popular in the  
15 past with airlines and other companies who desired a method for people to call  
16 them using a local number without having to maintain call centers everywhere.

17 **Q. HOW ARE FX CALLS ROUTED?**

1 A. FX calls are routed between the local switches as normal local calls, or as toll  
2 calls, depending on whether the NPA-NXX of the FX number being called is  
3 included in the calling switch's table of "locally dialable" NPA-NXXs. Neither  
4 the originating nor terminating switch has any way to know where the end user  
5 with the FX line is actually located, nor does it matter for proper switching and  
6 delivery of the traffic. The switch that hosts the FX customer has a circuit coming  
7 in that it associates with phone service, providing dial tone and other local  
8 services. The switch has no way to know whether the customer loop is 500 yards,  
9 2 miles, or 200 miles long.

10 **Q. HOW ARE FX CALLS BILLED?**

11 A. When a customer of one phone company places a call to a customer of another  
12 phone company and the originating and terminating phone numbers are assigned  
13 to rate centers which are rated as "local" to each other by the originating carrier,  
14 the call is rated as a local call and there is no toll charge. It does not matter if the  
15 calling or called party is 500 yards, 2 miles, or 200 miles from the end office out  
16 of which the number is assigned. The FX line is paid for separately by the FX  
17 customer to the FX providing carrier. No toll charges are applied to calls to the  
18 FX number from numbers assigned within the same local calling area as the FX  
19 number. Interestingly, When the FX customer with a phone number assigned to a

1 foreign exchange receives a call from some who is physically within the same  
2 exchange — like a next door neighbor — toll charges are applied. Inter-carrier  
3 compensation is based on the originating and terminating phone numbers.

4 **Q. IS QWEST'S INTERCONNECTION TRUNKING THE SAME NO**  
5 **MATTER WHERE THE LEVEL 3 END USER CUSTOMER IS**  
6 **LOCATED?**

7 A. Yes. Qwest's trunking is always to the POI, no matter where the Level 3 end-user  
8 customer is located. It doesn't matter if the Level 3 customer is 500 yards, 2  
9 miles, or 200 miles from the POI. Level 3 carries the traffic to its end-user  
10 customer, no matter where they are located. Qwest's interconnection trunking to  
11 the POI is the same no matter where the Level 3 customer that they are calling is  
12 actually located.

13 **Q. SO THE DISTANCE QWEST TRANSPORTS TRAFFIC IS THE SAME**  
14 **WHETHER THE LEVEL 3 CUSTOMER IS 500 YARDS, 2 MILES, OR 200**  
15 **MILES FROM THE POI?**

16 A. Yes. Qwest transports calls that it originates to the POI, regardless of where the  
17 Level 3 customer is located. The location of the Level 3 customer or end user is  
18 immaterial to Qwest's call transport or for Qwest's costs for that matter. Mr.

1           Gates will discuss in his testimony how Qwest's costs are the same no matter  
2           where the Level 3 end user is located.

3    **XII. Conclusions**

4  
5    **Q.    HAVE YOU REVIEWED THE CONTRACT LANGUAGE PROPOSED BY**  
6    **LEVEL 3 AND QWEST IN THIS CASE?**

7    A.    Yes, I have.

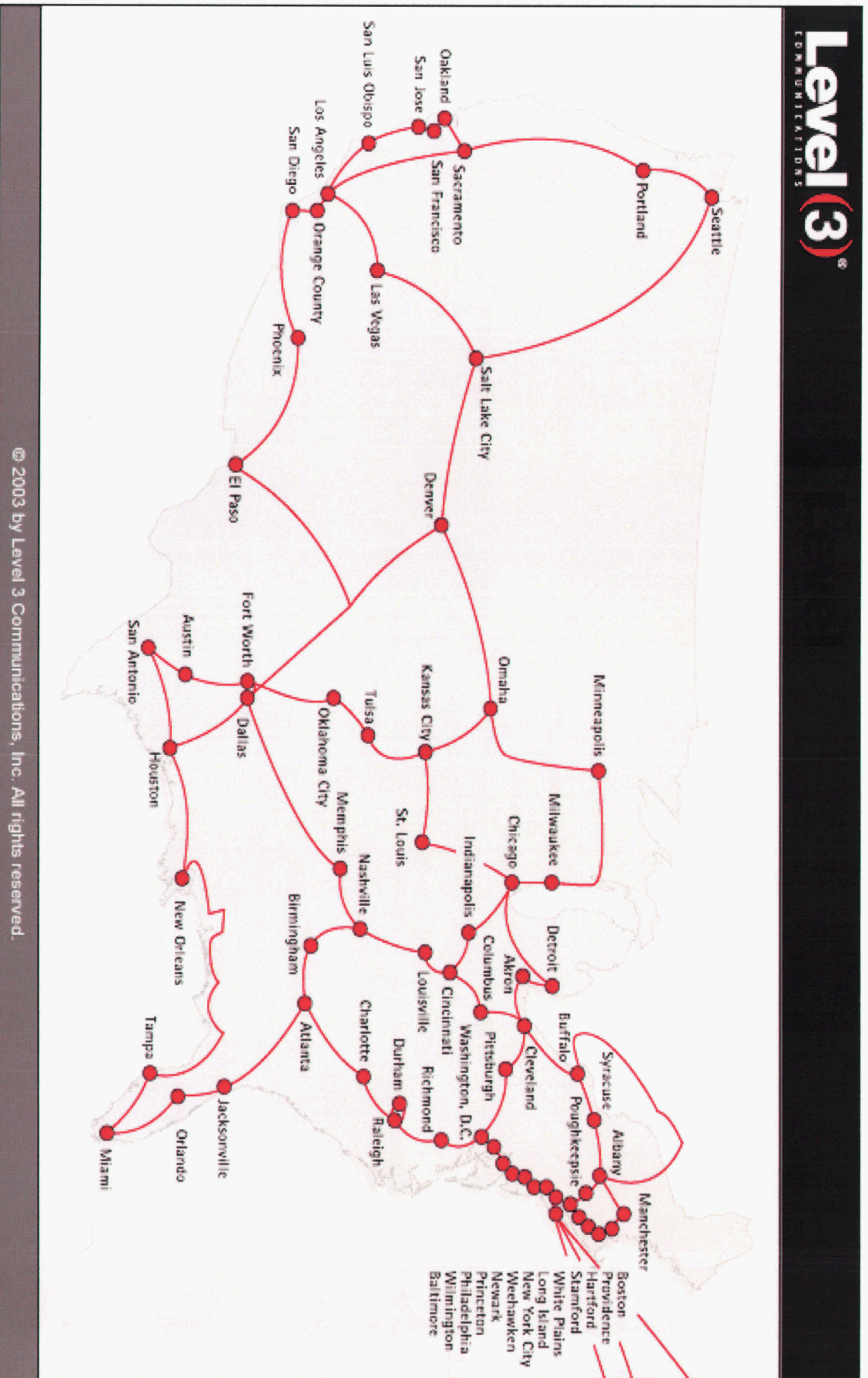
8    **Q.    FOR THE ISSUES YOU HAVE ADDRESSED, WHICH LANGUAGE IS**  
9    **MORE CONSISTENT WITH THE POINTS YOU HAVE MADE IN THIS**  
10   **TESTIMONY?**

11   A.    Level 3's language is reasonable and balanced from a technical and engineering  
12          standpoint and is consistent with the FCC's orders from an engineering point of  
13          view. Adoption of Qwest's language, by contrast, would require the parties to  
14          degrade the efficiency of their networks, imposing substantial costs on Level 3  
15          and possibly on Qwest as well, while at the same time potentially permitted  
16          Qwest to bill Level 3 for costs and charges for functions that Qwest itself should  
17          perform without a charge to Level 3.

1 Q. DOES THIS CONCLUDE YOUR TESTIMONY?

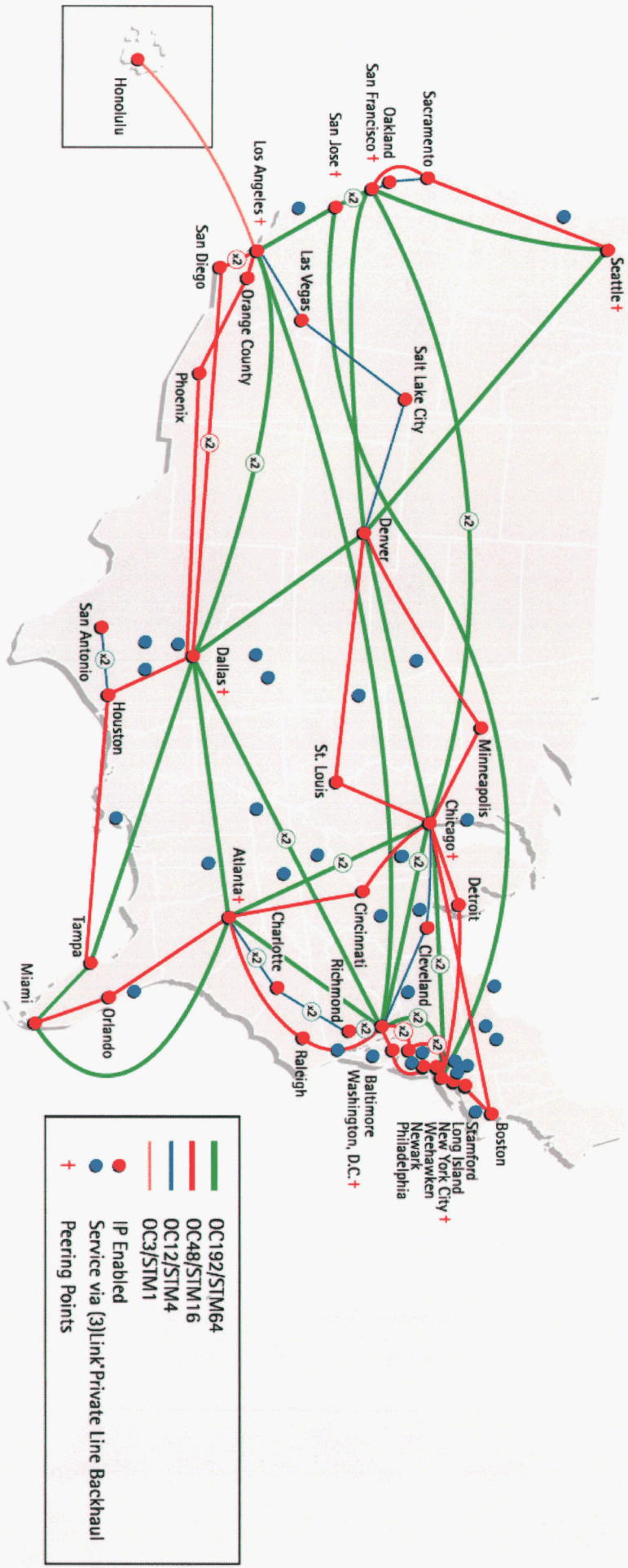
2 A. Yes

# Exhibit RRD #1: Level 3 Fiber Network



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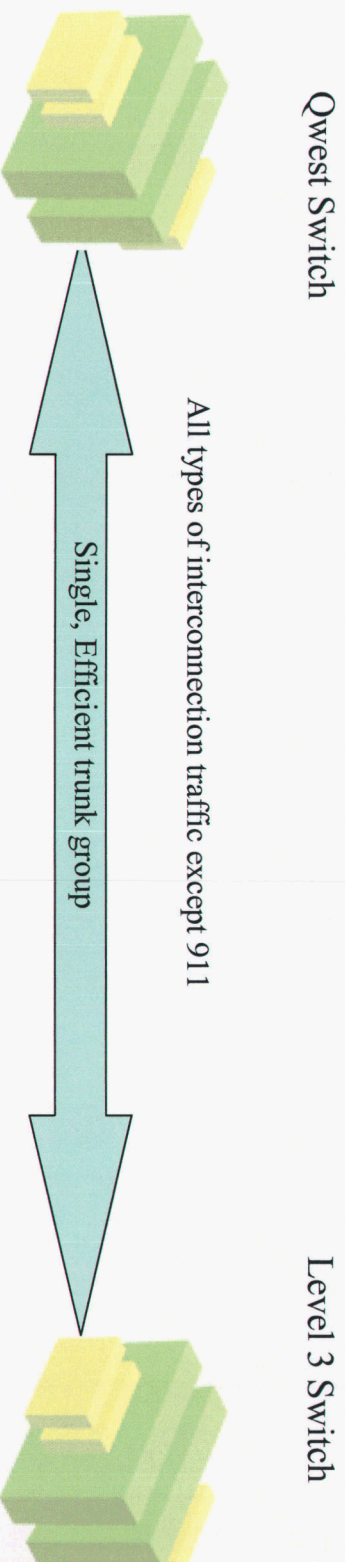
# Exhibit RRD #2: Level 3 IP Network



**Exhibit RRD #3: Level 3 Facilities in Arizona**

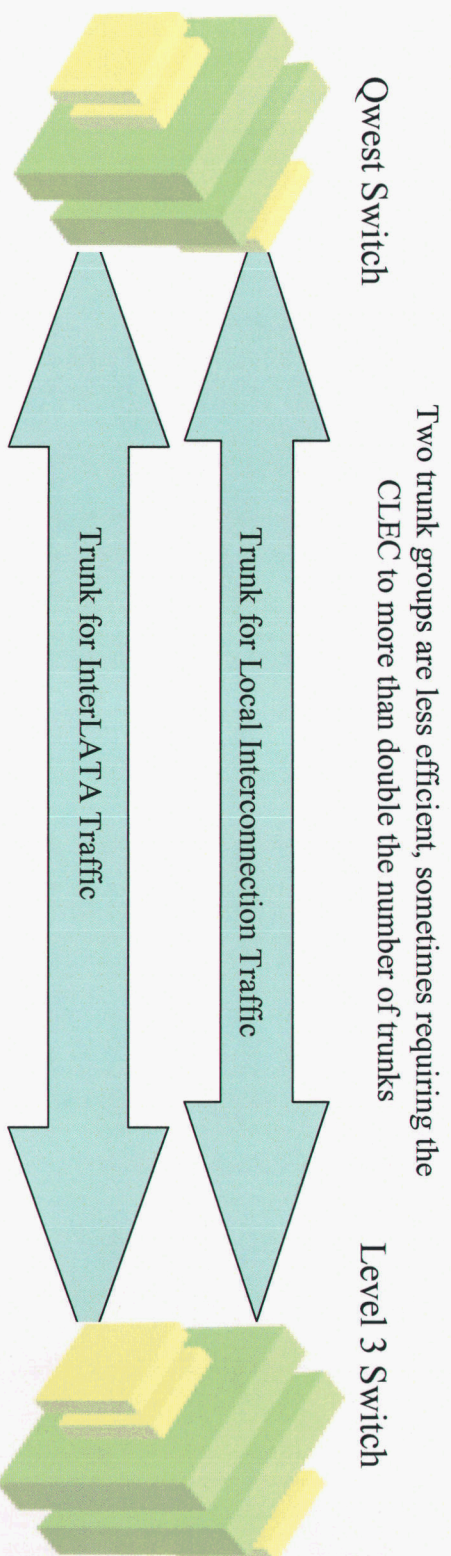


## Exhibit RRD #4: COMBINING TRAFFIC ON A SINGLE TRUNK GROUP



**A single trunk group with combined traffic is much more efficient, requiring fewer facilities, fewer trunk ports and less equipment**

## Exhibit RRD #5: QWEST DEMANDS SEPARATE TRUNK GROUPS



Two trunk groups do the work of one efficient trunk group. Qwest's demand would force Level 3 to build two separate networks. This requires additional trunk terminations for Qwest as well. Qwest may actually be demanding additional trunk groups for Transit Traffic and IP Traffic.

Exhibit RRD #6: VoIP Network Configurations

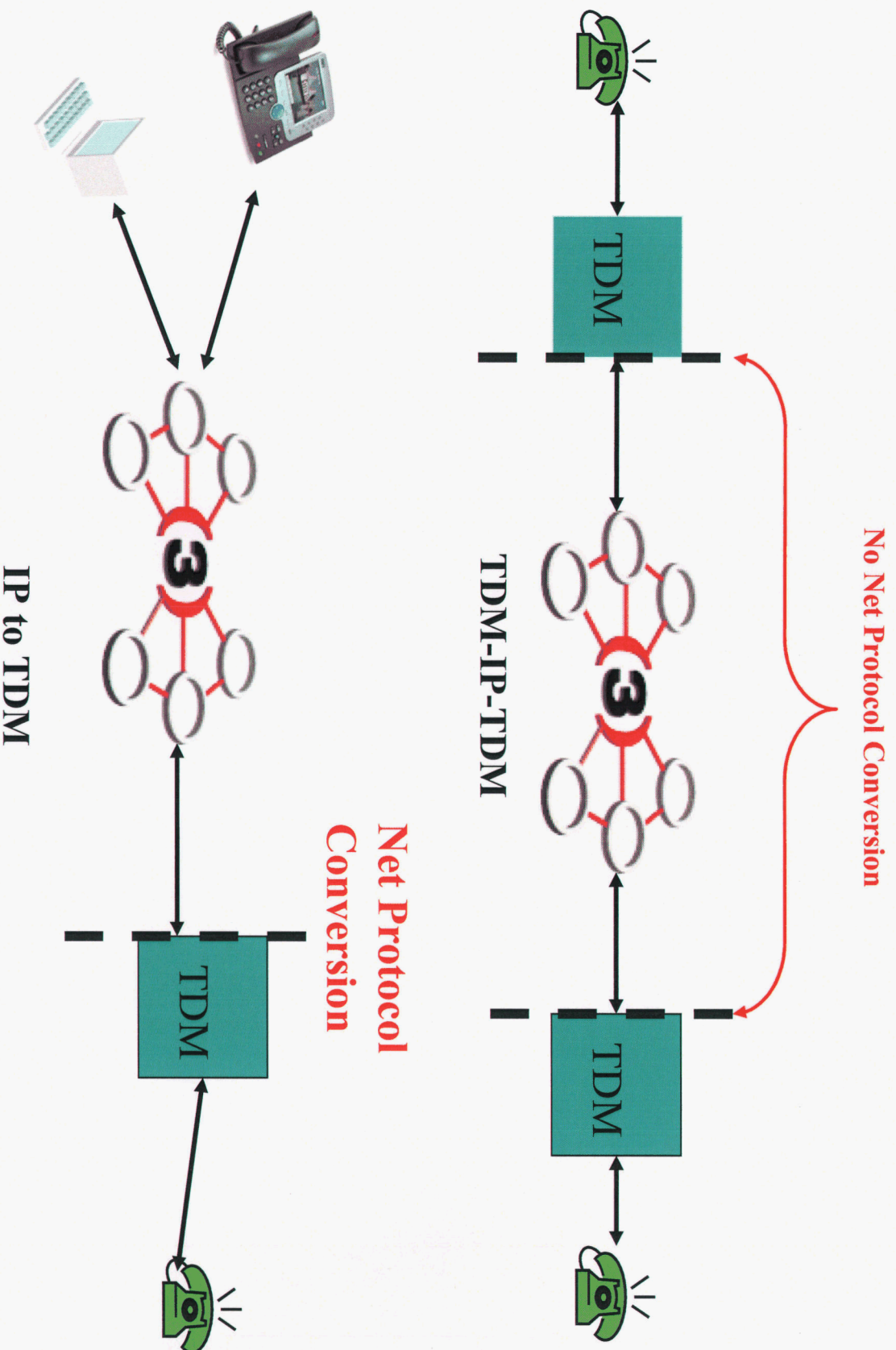


Exhibit RRD #7: ESP Exemption—Pre 1996

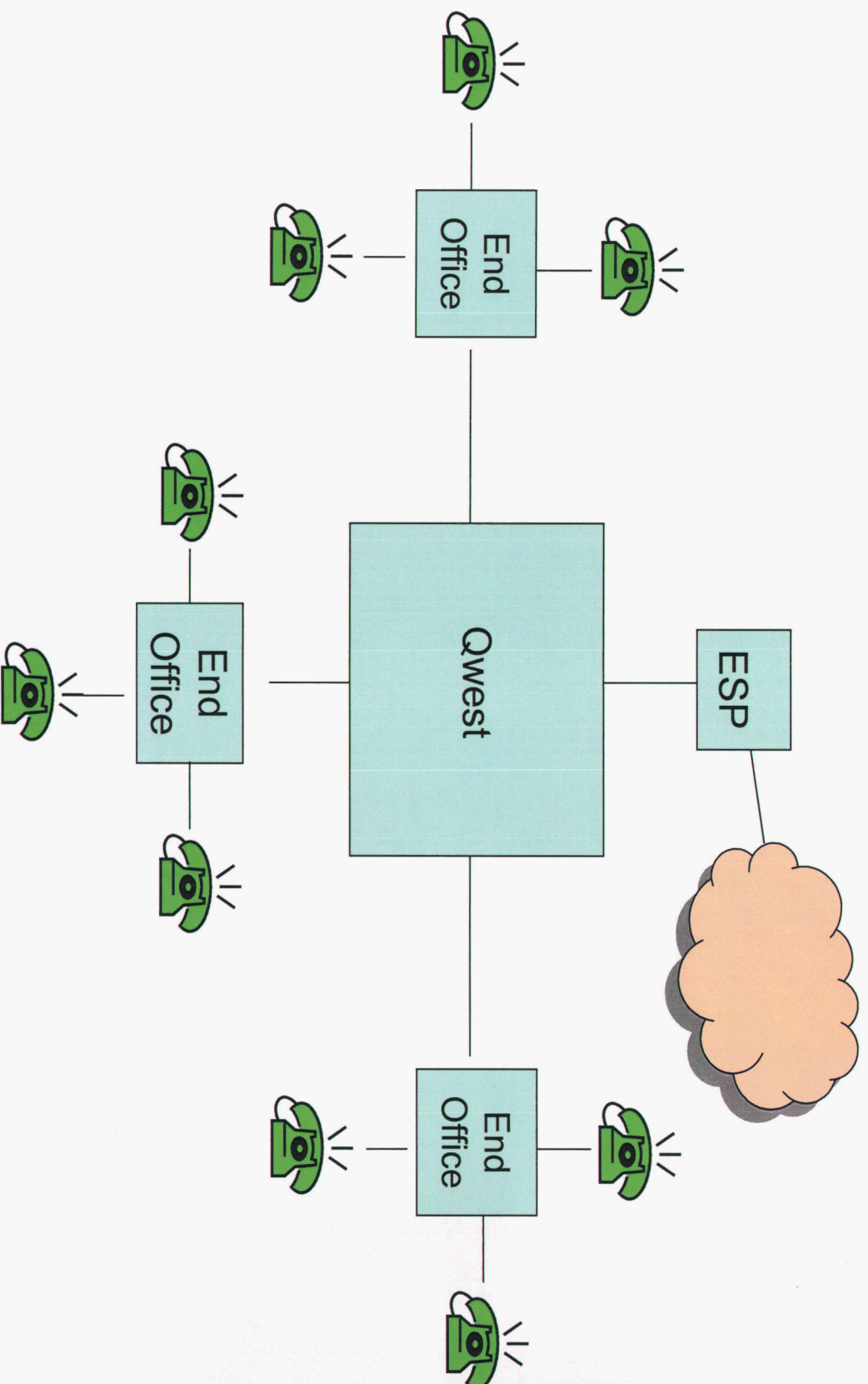
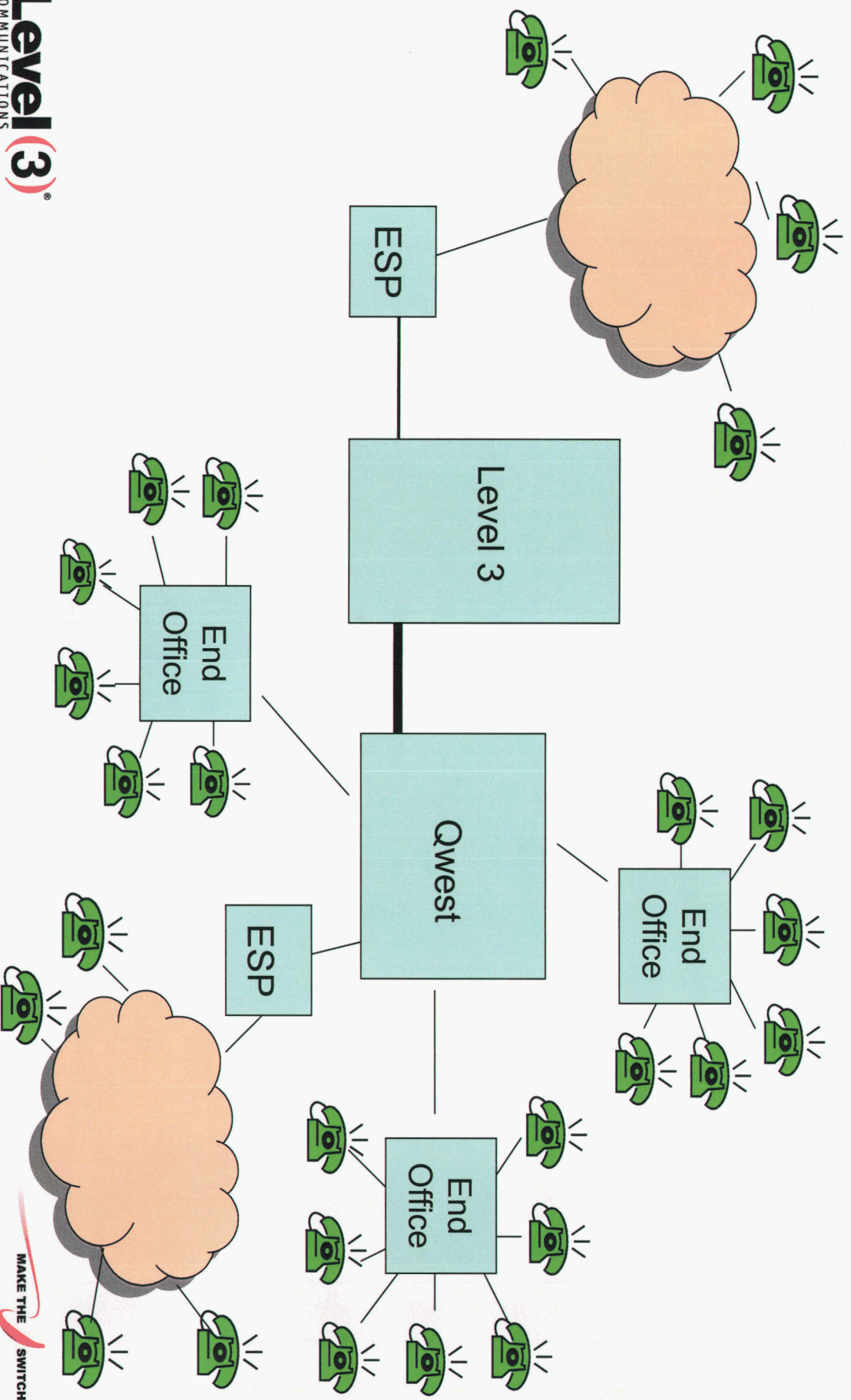
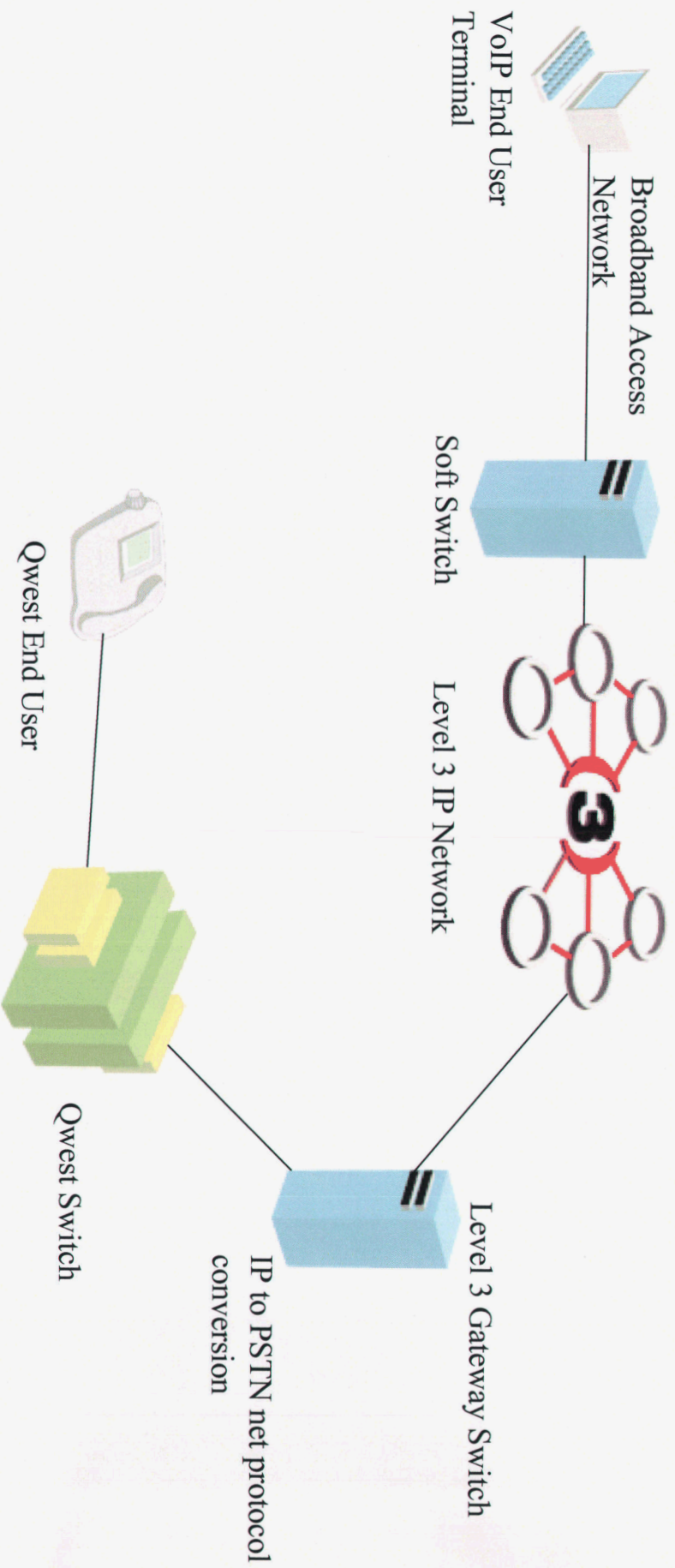


Exhibit RRD #8: ESP Exemption—post 1996



# Exhibit RRD #9: VoIP CALL FLOW

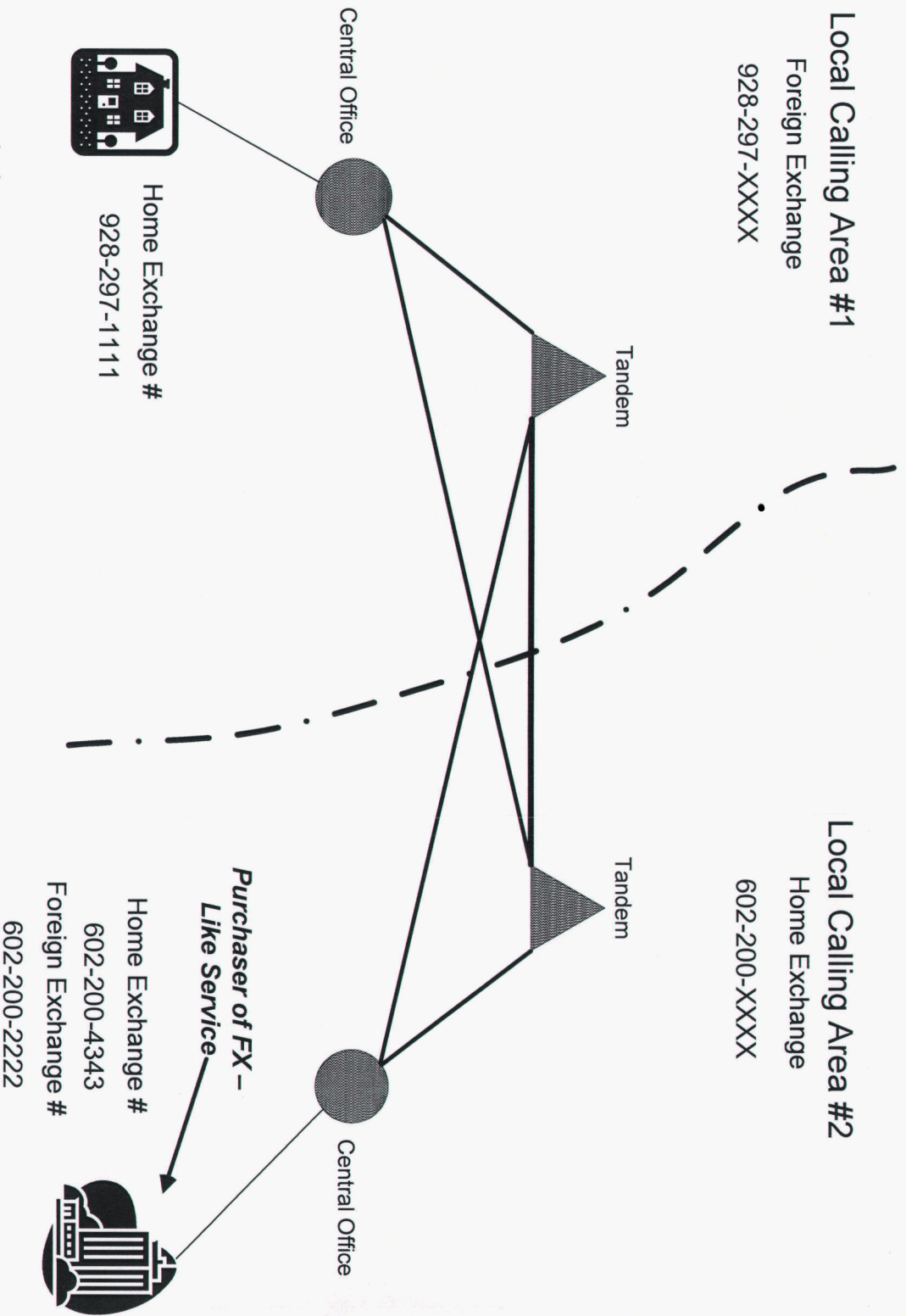


VoIP terminals allow new features and functions and a host of data and network applications

**Level(3)**<sup>®</sup>  
COMMUNICATIONS

Exhibit RRD #10: Traditional FX Service (a)

Traditional FX Call  
From LCA 1 to LCA 2



## Exhibit RRD # 11 Traditional FX Service

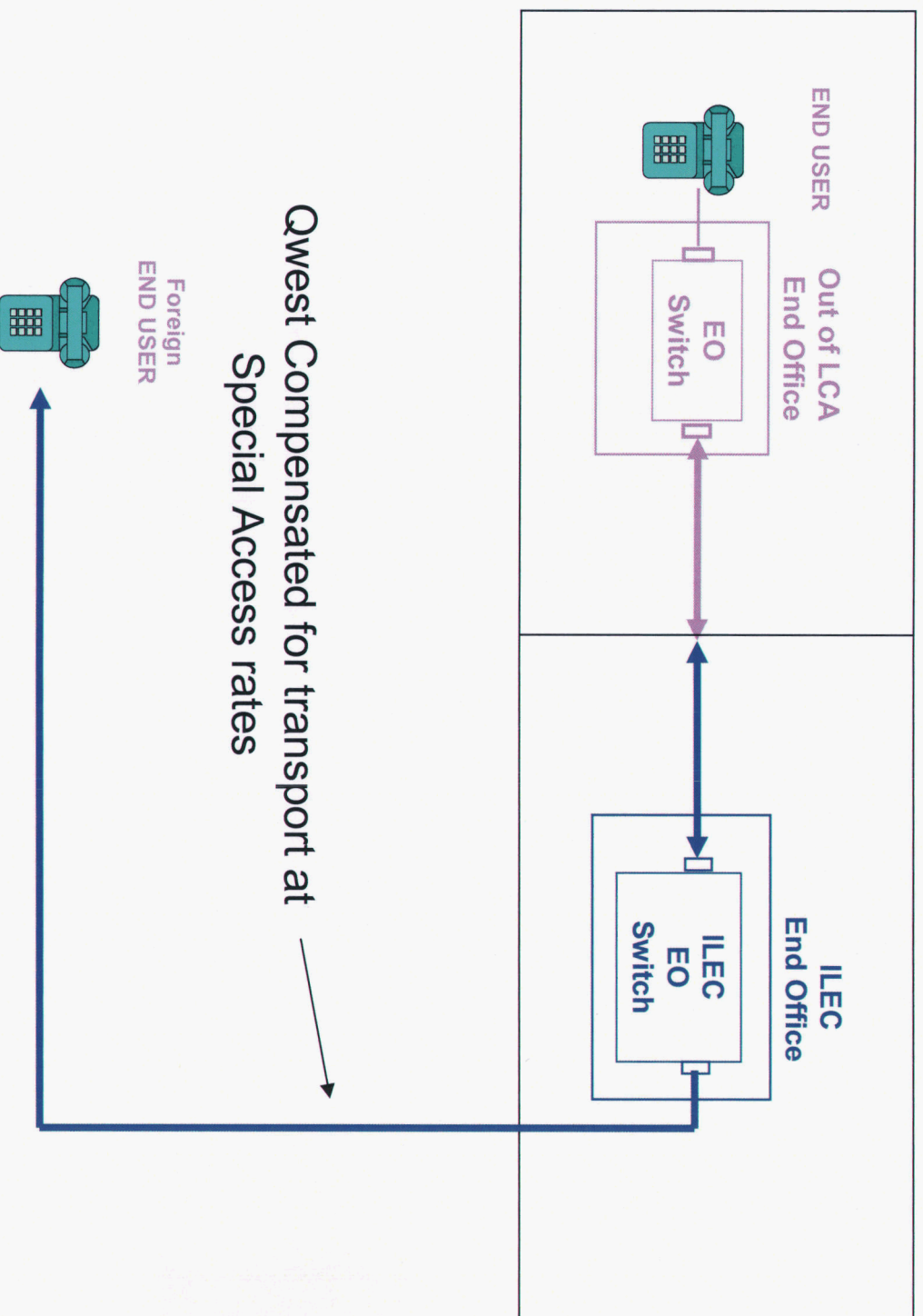


Exhibit RRD #12: FX-Like Service

Typical "FX – Like" or "VNXX" Call  
From LCA 1 to LCA 2

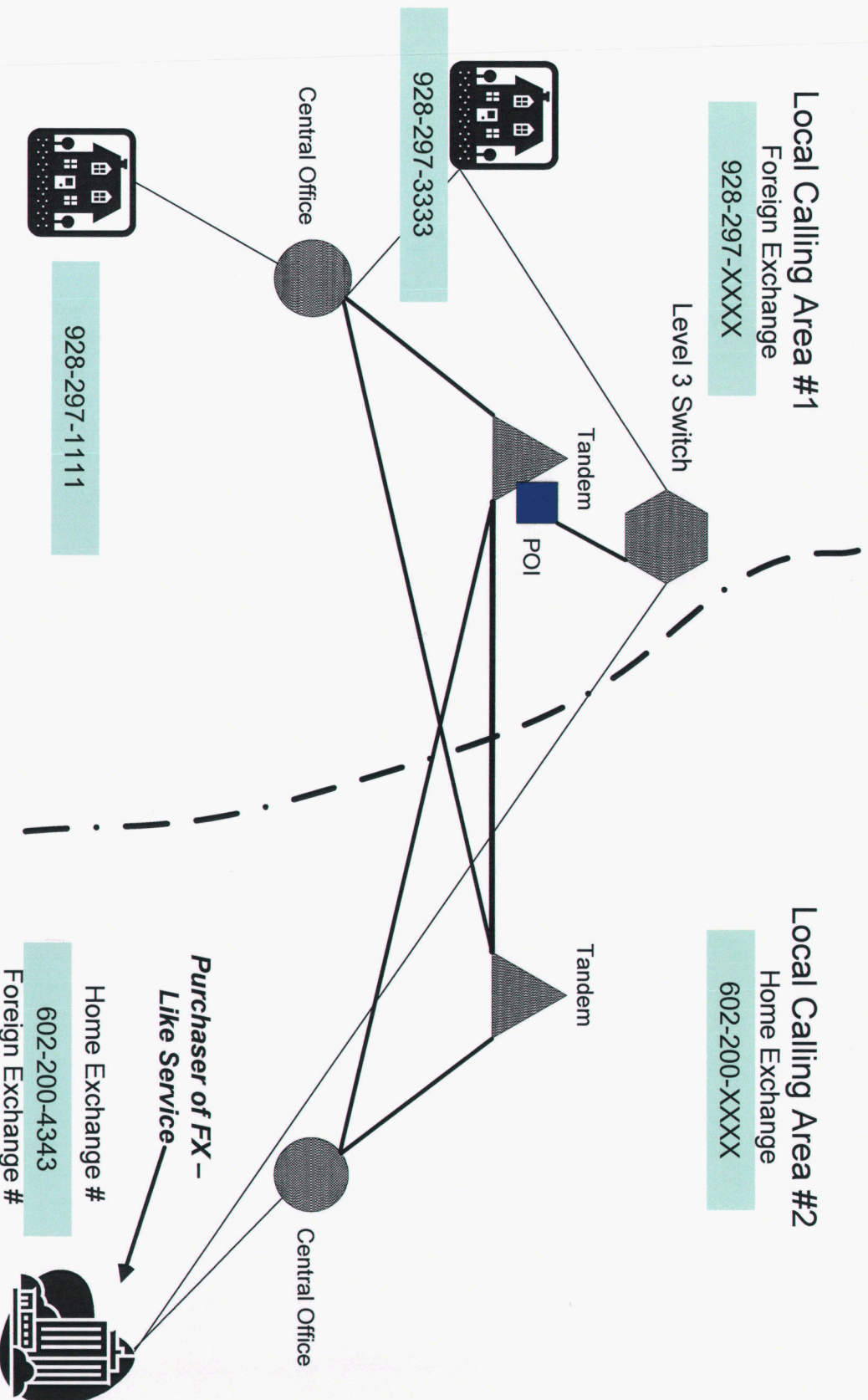
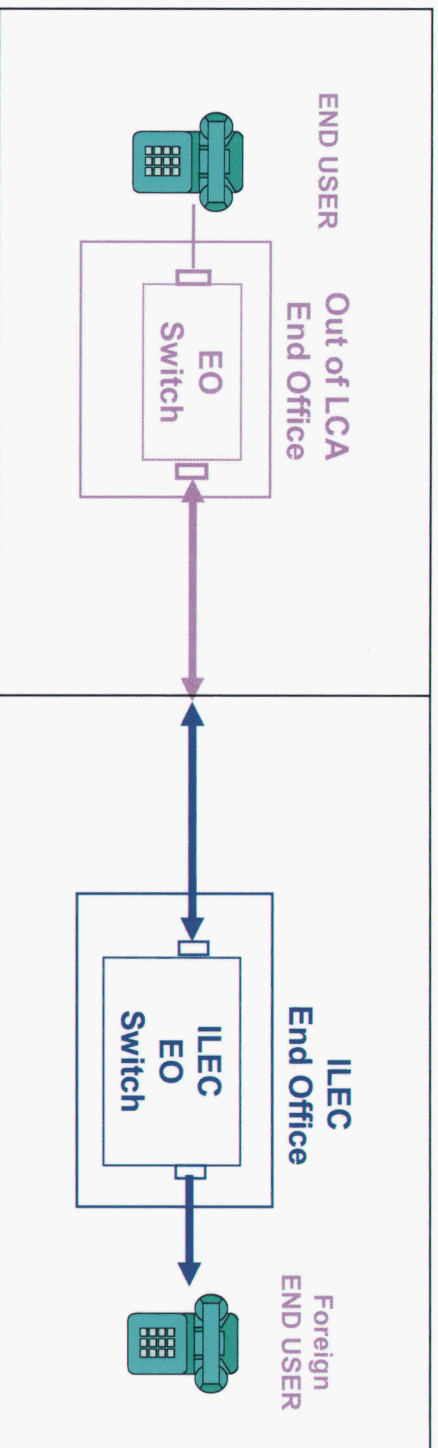


Exhibit RRD # 13: Traditional Local Service



# Exhibit RRD # 14: CLEC Local Service

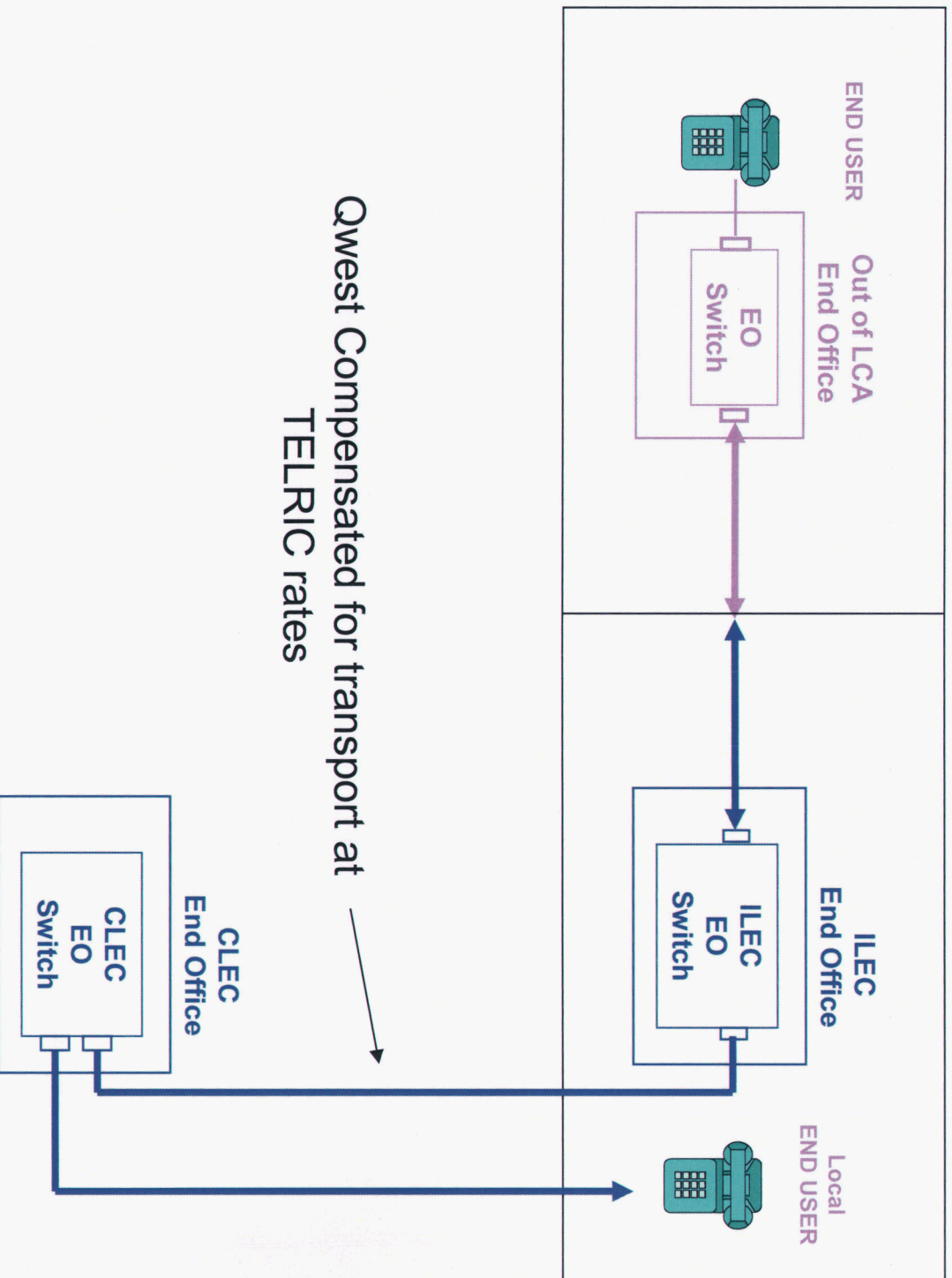
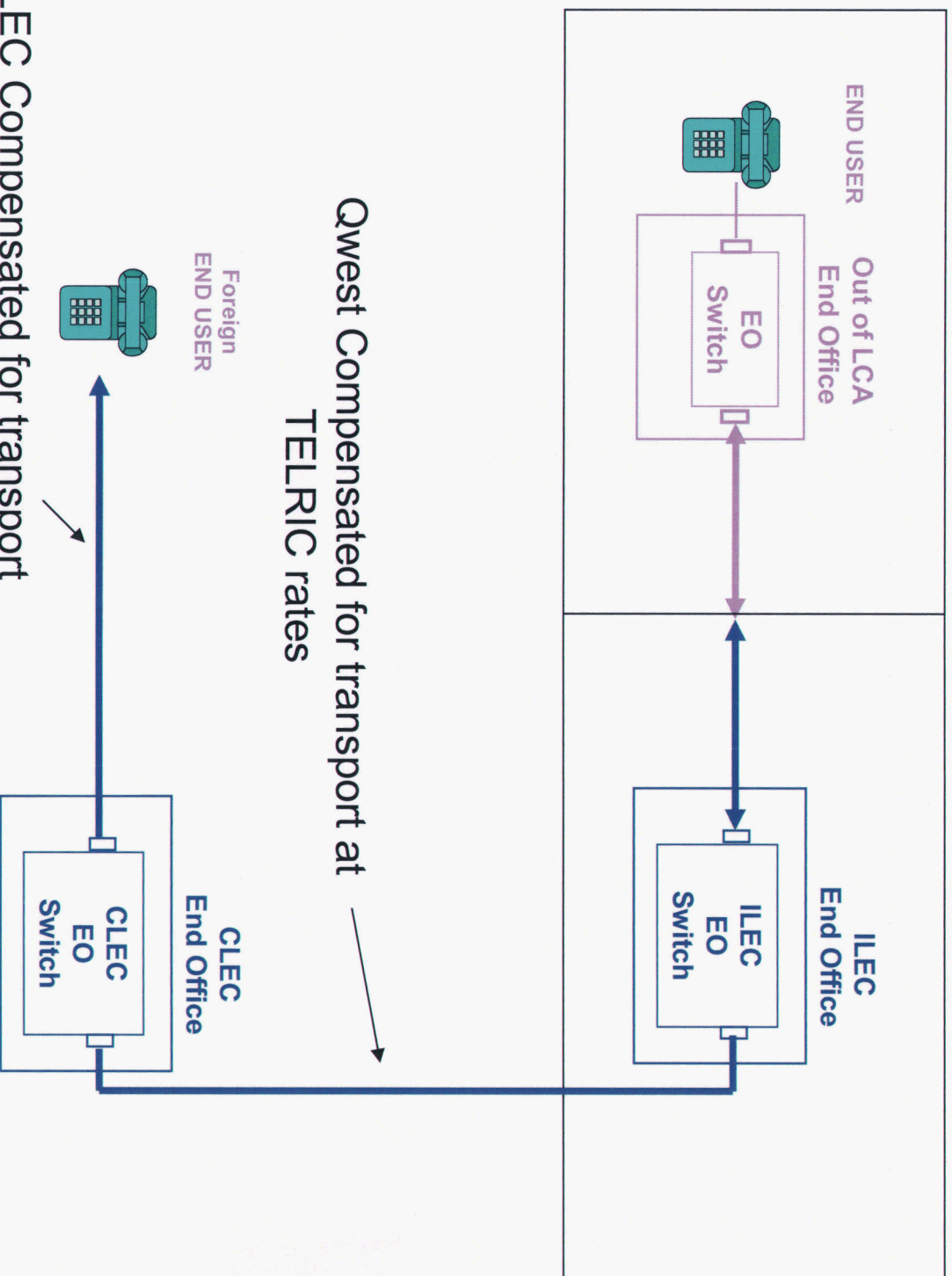
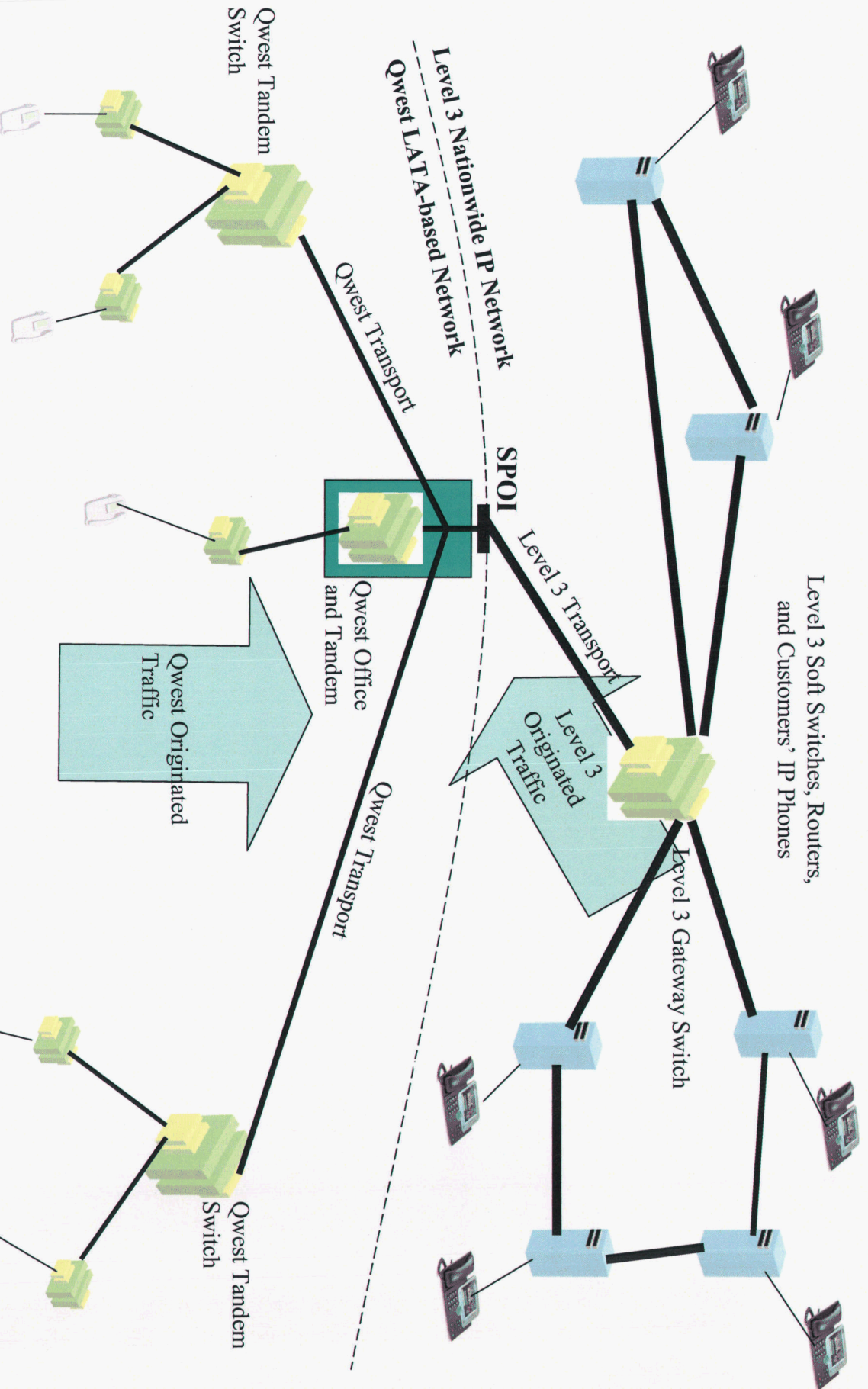


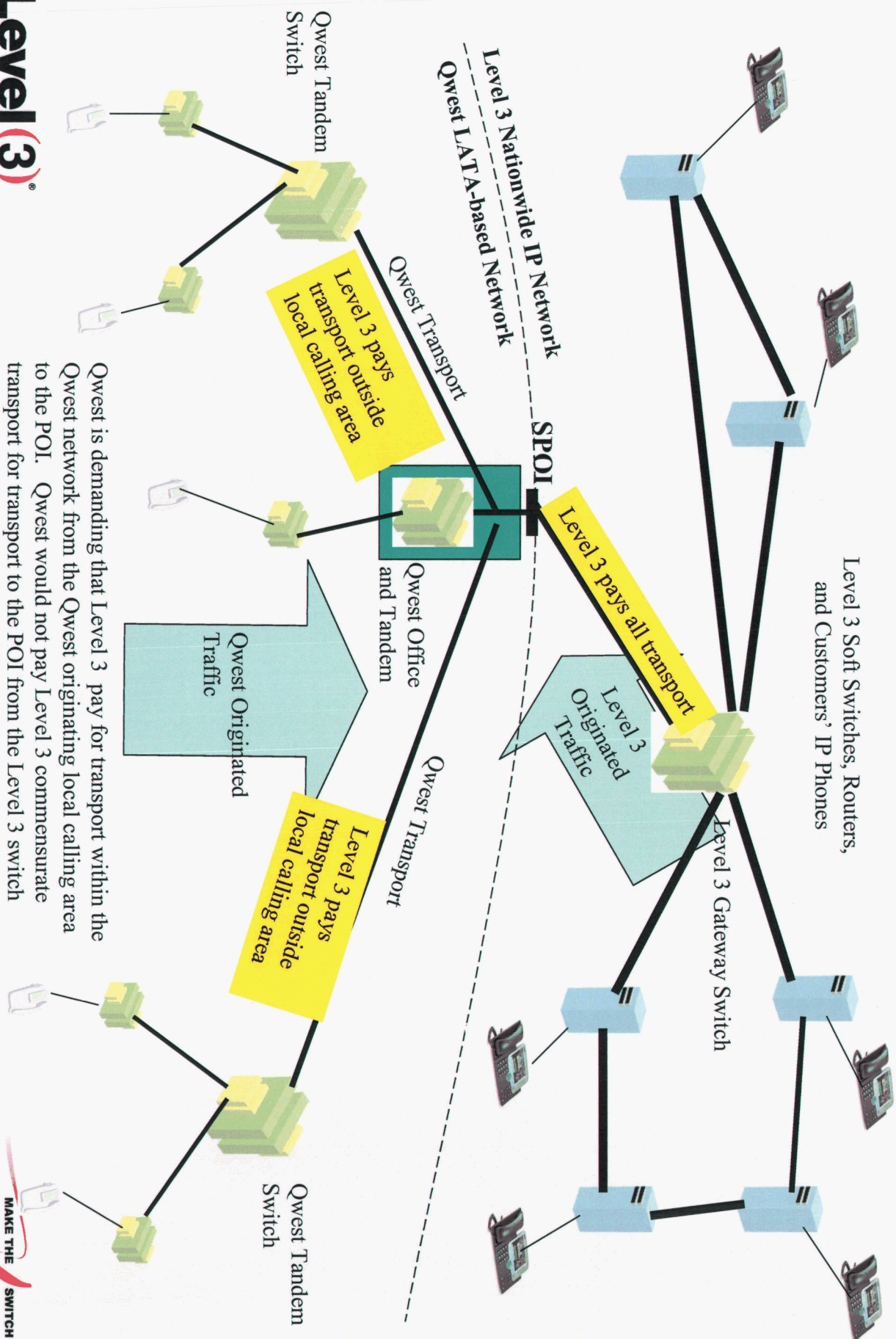
Exhibit RRD #15: CLEC FX Service



# Exhibit RRD # 16: SPOI CONFIGURATION



# Exhibit RRD # 17: SPOI CONFIGURATION – QWEST PROPOSAL



Qwest is demanding that Level 3 pay for transport within the Qwest network from the Qwest originating local calling area to the POI. Qwest would not pay Level 3 commensurate transport for transport to the POI from the Level 3 switch

**BEFORE THE ARIZONA CORPORATION COMMISSION**

DOCKET NO. T-03654A-05-0350  
T-01051B-05-0350

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IN THE MATTER OF LEVEL 3 COMMUNICATIONS, LLC'S PETITION FOR  
ARBITRATION PURSUANT TO SECTION 252(b) OF THE COMMUNICATIONS  
ACT OF 1934, AS AMENDED BY THE TELECOMMUNICATIONS ACT OF  
1996, AND THE APPLICABLE STATE LAWS FOR RATES, TERMS, AND  
CONDITIONS OF INTERCONNECTION WITH QWEST CORPORATION.

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**DIRECT TESTIMONY OF TIMOTHY J GATES  
ON BEHALF OF LEVEL 3 COMMUNICATIONS, LLC**

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July 15, 2005

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**INTRODUCTION**

**Q. PLEASE STATE YOUR NAME, OCCUPATION AND BUSINESS ADDRESS.**

A. My name is Timothy J Gates. My business address is QSI Consulting, 819 Huntington Drive, Highlands Ranch, Colorado 80126.

**Q. WHAT IS QSI CONSULTING, INC. AND WHAT IS YOUR POSITION WITH THE FIRM?**

A. QSI Consulting, Inc. ("QSI") is a consulting firm specializing in traditional and non-traditional utility industries, econometric analysis and computer aided modeling. I currently serve as Senior Vice President.

**Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND WORK EXPERIENCE.**

A. I received a Bachelor of Science degree from Oregon State University and a Master of Management degree in Finance and Quantitative Methods from Willamette University's Atkinson Graduate School of Management. Since I received my Masters, I have taken additional graduate-level courses in statistics and econometrics. I have also attended numerous courses and seminars specific to the telecommunications industry, including both the NARUC Annual and NARUC Advanced Regulatory Studies Programs.

Prior to joining QSI, I was a Senior Executive Staff Member at MCI. I was employed by MCI and/or MCI/WorldCom for 15 years in various public policy positions. While at MCI I managed various functions, including tariffing, economic

1 and financial analysis, competitive analysis, witness training and MCI's use of  
2 external consultants. Prior to joining MCI, I was employed as a Telephone Rate  
3 Analyst in the Engineering Division at the Texas Public Utility Commission and  
4 earlier as an Economic Analyst at the Oregon Public Utility Commission. I also  
5 worked at the Bonneville Power Administration (United States Department of  
6 Energy) as a Financial Analyst doing total electric use forecasts while I attended  
7 graduate school. Prior to doing my graduate work, I worked for ten years as a  
8 reforestation forester in the Pacific Northwest for multinational and government  
9 organizations. Exhibit TJG-1, attached hereto to this testimony, is a summary of my  
10 work experience and education.

11 **Q. HAVE YOU EVER TESTIFIED BEFORE THIS COMMISSION?**

12 A. Yes. I have submitted testimony or comments in no less than eleven (11) docketed  
13 proceedings before the Commission in the last eighteen (18) years, most of which  
14 pertain to opening Arizona telecommunications markets to competition. I have also  
15 testified more than 200 times in 43 other states and filed comments with the FCC on  
16 various public policy issues ranging from costing, pricing, local entry and universal  
17 service to strategic planning, merger and network issues. As noted above, a list of  
18 proceedings in which I have filed testimony or provided comments is attached hereto  
19 as Exhibit TJG-1.

20 **Q. ON WHOSE BEHALF WAS THIS TESTIMONY PREPARED?**

21 A. This testimony was prepared on behalf of Level 3 Communications, LLC.  
22 ("Level 3"), a certificated competitive local exchange carrier ("CLEC") in Arizona.

**Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

A. The purpose of my testimony is to address certain issues identified in the Level 3 Petition for Arbitration ("Petition").<sup>1</sup> Specifically, I will address: **Issue 1:** Interconnection Architecture; **Issue 2:** Separate Trunk Groups; **Issue 3:** Internet Service Provider ("ISP") Bound Traffic, Relative Use Formula ("RUF"), and Virtual NXX ("VNXX"); and **Issue 4:** Voice Over Internet Protocol ("VoIP"). Some of these disputes are primarily engineering issues, but I will be addressing them from an economic perspective.

**Q. HOW IS YOUR TESTIMONY ORGANIZED?**

A. My testimony is organized by issue. The various discussions of the Tier 1 issues can be found on the following pages:

**Issue 1** Interconnection Architecture.....Page 9

**Issue 2** Separate Trunk Groups.....Page 25

**Issue 3** ISP-Bound Traffic, VNXX and RUF.....Page 31

**Issue 4** VoIP .....Page 52

**Q. WHAT KEY ECONOMIC PRINCIPLES APPLY TO THE ISSUES IN THIS ARBITRATION?**

A. All of my recommendations in this matter are based on a few simple but important economic principles:

---

<sup>1</sup> See, Petition of Level 3 Communications, LLC for Arbitration of an Interconnection Agreement with Qwest Corporation, pursuant to Section 252(B) of the Telecommunications Act of 1996; filed on May 13, 2005 ("Petition").

- 1       • **First**, neither party to an interconnection agreement should be able to impose  
2       unnecessary costs on the other. Obviously the process of interconnection itself  
3       entails certain costs, some of which fairly and properly fall on each party. But  
4       neither party should be able to insist on interconnection arrangements that are  
5       costly to the other party *for no good reason*. As a society, we want  
6       interconnection arrangements to be as efficient as possible; requiring needless  
7       expense is inconsistent with that goal.
- 8       • **Second**, interconnection arrangements should reflect the most efficient technical  
9       means for handling any particular situation, even if that that is not the technical  
10      arrangement currently in place for one of the parties. If a party can prevent an  
11      efficient arrangement simply because that party has not taken the time or effort to  
12      become efficient itself, the interconnection agreement will, in this respect,  
13      become a government-sanctioned transfer of wealth from the more efficient party  
14      to the less efficient party. A similar transfer of wealth will occur if the incumbent  
15      is allowed to force inefficiencies on the party with which it interconnects. Such  
16      inefficiencies do not make any economic sense and are not in the public interest.
- 17      • **Third**, it needs to be very clear that the incumbent's way of doing things is not  
18      necessarily the most efficient way of doing things. From an economic perspective  
19      the purpose of the 1996 Act is to enable and facilitate competition in traditionally  
20      monopolized telecommunications markets by removing economic and operational

1           impediments.<sup>2</sup> Further, with the rapid pace of technological advances in transport  
2           and switching technologies, no rational provider would adopt the traditional  
3           technologies and methods of operation of the incumbent. Facilitating and  
4           enabling competition, therefore, necessarily requires analyzing interconnection  
5           and intercarrier compensation issues from a forward-looking perspective in which  
6           the technology that is most efficient from a long-run economic cost perspective  
7           that may not include the technology currently in use by the incumbent. It follows  
8           that “because the incumbent does it that way” is not only *not* a good argument in  
9           favor of a particular resolution of an issue — in many cases it might be a *good*  
10          reason to reach the opposite conclusion.

- 11          • ***Fourth*** and finally, a recognition of the critical role that technological advance  
12          has played in contributing to economic welfare in the field of telecommunications  
13          justifies a preference for the result that favors, and enables, new technology.  
14          There is no dispute that communications technology is a decreasing cost industry.  
15          From an economic perspective, anyone who has a large sunk investment in a  
16          particular technical approach will rationally do whatever he can to prevent new  
17          technologies from making his technology obsolete. But this private interest in  
18          protecting existing investment from the forces of competition is directly contrary  
19          to the public interest in innovation and the deployment of new, more efficient

---

<sup>2</sup> In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996; **FIRST REPORT AND ORDER**; CC Docket No. 96-98; Released August 8, 1996; at ¶3. Hereinafter referred to as the FCC’s “*Local Competition Order*.”

1 technologies. From an economic perspective it is not only appropriate but  
2 necessary for decisions regarding interconnection disputes to take this factor into  
3 account.

4 **Summary of Recommendations**

5 **Q. WITH THOSE PRINCIPLES IN MIND, PLEASE SUMMARIZE YOUR**  
6 **RECOMMENDATIONS ON THE KEY ISSUES SEPARATING QWEST AND**  
7 **LEVEL 3 IN THIS ARBITRATION.**

8 **A. Issue 1** relates to interconnection architecture. Level 3 wants the agreement to clearly  
9 state that it is entitled to interconnect with Qwest at a single point of interconnection  
10 (“POI”) in each LATA; to state that all types of traffic will be exchanged by means of  
11 that physical POI; and that each party will bear the costs of its facilities and  
12 arrangements on its side of the POI, including all costs of getting its own traffic to the  
13 POI. This is the correct result from an economic viewpoint.

14 Qwest’s network architecture reflects a mix of technology and economic  
15 decisions that Qwest has made over many decades. That architecture does not  
16 remotely reflect what an efficient firm would construct today. It follows that Qwest  
17 should not be able to force Level 3 to spend money to duplicate or mirror Qwest’s  
18 architecture — which is essentially what a multiple-POI requirement does. Rather,  
19 each carrier should be responsible for its own network, with the hand-off of traffic  
20 between the networks occurring at a single, efficient point. Of course, this does not  
21 preclude the parties from voluntarily agreeing to establish whatever additional POIs  
22 they may choose in particular cases. It does, however, prevent Qwest from imposing

1 transport and other responsibilities onto Level 3 that arise from Qwest's legacy  
2 network architecture.

3  
4 **Issue 2** relates to the use of trunk groups that carry different "types" of traffic on a  
5 combined basis to and from the POI. Level 3 wants all traffic exchanged between  
6 Qwest and Level 3 switches within a LATA to be carried on a single trunk group  
7 between its network and the POI. Qwest wants Level 3 to separate the traffic and  
8 route it over different trunk groups based on whether the traffic falls into arbitrary  
9 categories. There is no sound economic basis for Qwest's proposal. As Mr. Ducloo  
10 testifies, from a technical perspective, taking a large volume of traffic and breaking it  
11 up into a set of smaller trunk groups degrades trunking efficiency, so that a higher  
12 total number of trunks — and therefore trunk ports on switches — is needed. In  
13 economic terms, this results in a pure deadweight loss — *i.e.* costs are imposed with no  
14 corresponding economic or societal benefit.

15 Qwest says that it needs traffic on separate trunk groups in order to properly  
16 apply different billing rates to the different types of traffic, but that is simply not true.  
17 All that is required is to measure the total volume of traffic on a trunk group, and then  
18 apply factors (based on a periodic analysis of the traffic) indicating what proportion  
19 of the traffic is subject to reciprocal compensation, what proportion is subject to  
20 access charges, etc. These jurisdictional factors have been used for decades.

21 **Issue 3** relates generally to whether ISP-bound traffic should be subject to the FCC-  
22 mandated rate of \$0.0007 per minute even when the ISP's equipment is not in the

1 Qwest-determined originating local calling area of the end user dialing up the ISP.  
2 Level 3 maintains that this low rate should apply because the FCC has preempted the  
3 states as to intercarrier compensation for this traffic; Qwest apparently takes the view  
4 that if the ISP's equipment is not in the originating local calling area, not only should  
5 Qwest not pay Level 3 the \$0.0007, but Level 3 should actually pay Qwest  
6 originating access charges.

7 Qwest also wants to impose its own network costs on Level 3 Qwest's  
8 position is simply wrong. When Qwest delivers an ISP-bound call originated by its  
9 customer to Level 3's POI for termination, Qwest's costs are not affected in the  
10 slightest by the location of the ISP's equipment. Moreover, Qwest's position would  
11 impose a penalty on Level 3 for working with ISP customers to efficiently configure  
12 their equipment in a manner to minimize both their and Level 3's costs, or, put  
13 another way, would create an incentive on Level 3 and its ISP customers to configure  
14 their equipment inefficiently simply in order to avoid regulatorily-imposed payments  
15 to Qwest. From an economic perspective, Qwest's position is totally irrational and  
16 discriminatory and should be rejected.

17 **Issue 4** relates to the application of the \$0.0007 rate to IP-enabled voice traffic,  
18 generally referred to as Voice over Internet Protocol or "VoIP", as well as purely  
19 "ISP-bound" traffic. This type of traffic should not be burdened with "access  
20 charges." Further, there is no technical or economic reason to treat VoIP differently  
21 from other ISP-bound traffic. Qwest wants to either exclude this type of traffic  
22 entirely from interconnection or impose special, higher charges for terminating that

1 traffic. Here again, Qwest's position makes no economic sense. Qwest does not  
2 incur any costs for terminating this VoIP traffic that differ from its costs in  
3 terminating traffic that Qwest would acknowledge is subject to the lower rate. From  
4 an economic viewpoint, it appears that Qwest is trying to ensure that growth of this  
5 new technology is inhibited by means of making it more costly than necessary to  
6 actually complete such calls. This is contrary to the public interest and to the efficient  
7 development and operation of the market. Unless there is some compelling legal or  
8 policy reason that *requires* the application of higher charges to this traffic — and I  
9 am certainly not aware of any — it makes sense to have the lower rate apply. I  
10 discuss each of these issues in more detail below.

11 Finally, I note that **Issue 5** in this matter is largely “legal” in nature, relating to  
12 the incorporation of certain terms by reference into the parties' interconnection  
13 agreement. I do not address that issue in this direct testimony.

14  
15 **Issue 1 -- Interconnection Architecture.**

16  
17 **Q. PLEASE SUMMARIZE THE POSITIONS OF LEVEL 3 AND QWEST WITH**  
18 **REGARD TO INTERCONNECTION ARCHITECTURE.**

19 **A.** Level 3 wants to exercise its right to establish a single POI for each LATA for the  
20 exchange of all types of traffic with Qwest, with each party responsible for the

1 facilities on its side of the POI.<sup>3</sup> Moreover, the only charges from one party to the  
2 other for terminating traffic delivered to the POI would be the applicable per-minute  
3 charges (reciprocal compensation or access). Qwest seeks to require the  
4 establishment of multiple POIs in some circumstances and to improperly impose onto  
5 Level 3 the cost of establishing and maintaining trunking arrangements put in place  
6 for Qwest's own convenience.

7 **Q. PLEASE PROVIDE A GENERAL OVERVIEW OF THE ECONOMIC**  
8 **RATIONALE FOR INTERCONNECTION PURSUANT TO THE ACT.**

9 A. Interconnection of networks is essential for the provision of telecommunications  
10 services. If two networks are not interconnected, their subscribers cannot call each  
11 other, which reduces the value of both networks. However, the economic effect of  
12 denial of interconnection is not the same for each network. If a large network denies  
13 interconnection to a smaller one, the impact on the large network may well be very  
14 small (since few of its customers will want or need to contact customers of the other  
15 network), while the denial of interconnection will be devastating to the smaller  
16 network, since its few subscribers would not be able to call anyone other than others  
17 on the same network. Where the dominant network became dominant as a result of  
18 government policy (as is the case with the ILECs), it would be wrong to ignore the  
19 potential that smaller networks might be harmed as a result of denial of

---

<sup>3</sup> As will be discussed later in this testimony, a POI is the point at which two networks interconnect for the exchange of traffic.

1 interconnection, or by inefficient interconnection, when government policy (the  
2 Telecom Act of 1996) now recognizes the importance of promoting competition.

3 **Q. DID CONGRESS RECOGNIZE THE IMPORTANCE OF**  
4 **INTERCONNECTION TO THE DEVELOPMENT OF COMPETITION?**

5 A. Yes. Congress recognized the importance of interconnection by requiring all  
6 telecommunications providers to interconnect, directly or indirectly, in Section  
7 251(a)(1) of the Act. But Congress also recognized that the ILECs were and would  
8 remain the overwhelmingly largest networks and the dominant carriers in any given  
9 area for the foreseeable future (and, nearly 10 years after the passage of the Act, this  
10 remains true). This situation gives the ILECs powerful economic leverage over  
11 CLECs: the ILEC will be strongly motivated to use its control over access to its large  
12 base of subscribers either to out-and-out destroy its competitors (by not allowing  
13 interconnection at all) or hamper their growth by only permitting interconnection on  
14 expensive or inefficient terms. So, Congress — quite rationally from an economic  
15 standpoint — imposed special interconnection duties on ILECs.

16 **Q. WHAT WERE THOSE SPECIAL INTERCONNECTION DUTIES IMPOSED**  
17 **ON ILECS?**

18 A. In Section 251(c)(2) of the Act, ILECs are required to permit a “requesting  
19 telecommunications carrier” to physically interconnect its network with that of the  
20 ILEC for the exchange of traffic. This limits the ability of the ILEC to exploit its  
21 market power — arising from its control of access to the overwhelming majority of

1 subscribers in an area — to the detriment of competitors and consumers who would  
2 benefit from a choice in providers.

3 The FCC implemented this basic interconnection requirement with its specific  
4 rules to make clear that once interconnection is established for the exchange of  
5 “traditional” traffic — telephone exchange service and exchange access — other  
6 types of traffic can and should be exchanged using the same facilities. Specifically, at  
7 ¶ 995 of the *Local Competition Order*, the FCC said:

8 [I]f a company provides both telecommunications and information  
9 services, it must be classified as a telecommunications carrier for purposes  
10 of section 251 ... [T]elecommunications carriers that have interconnected  
11 or gained access under sections 251(a)(1), 251(c)(2), or 251(c)(3), **may**  
12 **offer information services through the same arrangement, so long as**  
13 **they are offering telecommunications services through the same**  
14 **arrangement as well.** Under a contrary conclusion, a competitor would be  
15 precluded from offering information services in competition with the  
16 incumbent LEC under the same arrangement, thus increasing the  
17 transaction cost for the competitor. We find this to be contrary to the pro-  
18 competitive spirit of the 1996 Act. By rejecting this outcome we provide  
19 competitors the opportunity to compete effectively with the incumbent by  
20 offering a full range of services to end users without having to provide  
21 some services inefficiently through distinct facilities or agreements.<sup>4</sup>  
22

23 This is plainly the correct policy from an economic perspective. Once the investment  
24 has been made to establish a facility interconnecting two networks, it makes no sense  
25 to limit the use of that facility to particular types of traffic, if there are other types of  
26 traffic that also need to be exchanged. Instead, the most efficient use should be made  
27 of whatever physical interconnection facilities are established. As the FCC itself has  
28 noted, the obligations identified in section 251 are necessary to support the FCC's

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<sup>4</sup> See *Local Competition Order* at ¶ 995 (emphasis added).

1 goal of developing competition for the benefit of consumers and the economy.<sup>5</sup>

2 Interconnection should be established on a cost-based, efficient basis that inhibits the  
3 ILEC's use of market power in anti-competitive ways to erect barriers to the  
4 establishment of an effectively competitive market.

5 **Q. HOW DO THESE CONSIDERATIONS RELATE TO THE QUESTION OF**  
6 **USING A SINGLE POI PER LATA FOR INTERCONNECTION?**

7 A. The use of a single POI per LATA is generally an efficient and effective way to  
8 exchange all traffic between an ILEC and a CLEC's network. Requiring the CLEC to  
9 establish multiple POIs boils down to making the CLEC duplicate some or all of the  
10 ILEC's preexisting network architecture. This will not be efficient, given that the  
11 CLEC may serve a different customer base than the incumbent and will likely use  
12 different (and more modern) technology. As a result, there is every reason to think  
13 that requiring the CLEC to mirror the ILEC's network architecture will be inefficient  
14 and not in the public interest. Therefore, all that should be required is a single POI  
15 interconnection architecture.

16 **Q. PLEASE DEFINE A "POINT OF INTERCONNECTION" OR "POI."**

17 A. In order for Level 3 and Qwest to exchange traffic between their respective  
18 customers, they must physically interconnect their networks. Per the FCC's  
19 rules, "interconnection" refers to the physical linking of two networks for the  
20 mutual exchange of traffic between customers subscribed to the respective

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<sup>5</sup> Total Telecommunications Services, Inc and Atlas Telephone Company, Inc v. AT&T Corp, *Memorandum Opinion Order*, FCC 01-84, ¶ 25 (rel. Mar. 13, 2001).

1 networks.<sup>6</sup> A POI is simply the place where the two networks interconnect.

2 It is also normally viewed as the financial and physical demarcation point  
3 that defines where one party's financial and operational obligations end and  
4 the other party's begin.

5 **Q. WHO SHOULD BEAR THE COSTS OF INTERCONNECTION?**

6 A. Basically, each provider should bear its portion of the cost. Each carrier's subscribers  
7 benefit from the ability to make calls to and/or receive calls from the other carrier's  
8 subscribers. Of course, each carrier is really only able to control the costs and  
9 activities on its own network, not on the other party's network. Therefore, it is  
10 sensible to require that each carrier be responsible for the costs of its own network, on  
11 its side of the POI. This is precisely what the FCC has required in Rule 51.703(b).  
12 This rule says that each carrier is fully responsible for the costs incurred in getting  
13 traffic from its network to the POI.<sup>7</sup>

14 **Q. WHAT ARE THE ECONOMIC BENEFITS OF USING A SINGLE POI PER**  
15 **LATA?**

16 A. The key benefit of a single POI architecture is that it allows the carrier delivering  
17 traffic to aggregate that traffic onto a large, efficient transmission facility to the other  
18 carrier, while at the same time it allows the carrier receiving the traffic to route that  
19 incoming traffic in whatever manner is most efficient based on its own traffic and

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<sup>6</sup> See *Local Competition Order* at ¶ 176.

<sup>7</sup> 51.703(b) states, "A LEC may not assess charges on any other telecommunications carrier for telecommunications traffic that originates on the LEC's network."

1 network. Now, obviously, a large established carrier would benefit by being able to  
2 require its dependent competitor to deliver traffic to each and every switch in the  
3 established carrier's network, but from an overall societal point of view that would be  
4 terribly inefficient.

5 **Q. HOW WOULD THE DOMINANT PROVIDER BENEFIT BY REQUIRING A**  
6 **CLEC TO DELIVER TRAFFIC TO EVERY SWITCH?**

7 A. The most obvious benefit would be increasing the cost of the potential competitor and  
8 thereby disadvantaging that CLEC with respect to its entrance to, and operation in,  
9 the market. The FCC recognized the ILEC incentive to disadvantage CLECs.  
10 Specifically, the FCC noted:

11 Given the incumbent LEC will be providing interconnection to its  
12 competitors pursuant to the purpose of the 1996 Act, the LEC has the  
13 incentive to discriminate against its competitors by providing them  
14 less favorable terms and conditions of interconnection than it provides  
15 itself.<sup>8</sup>

16  
17 Requiring multiple POIs disadvantages the CLECs by increasing their costs. If the  
18 ILEC had the same customer and traffic characteristics as the CLEC it would also  
19 operate with a single POI. As such, requiring multiple POIs for CLECs when they  
20 are not justified is both anticompetitive and discriminatory, not to mention inefficient  
21 from both an economic and engineering perspective.

22 **Q. YOU SAID THAT QWEST'S PROPOSAL WOULD INCREASE LEVEL 3'S**  
23 **COSTS. IS THAT COMMON IN ARBITRATIONS?**

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<sup>8</sup> See *Local Competition Order* at ¶ 218.

1 A. Yes, unfortunately such proposals are common. It is not in the best interest of Qwest  
2 to make it easy or cheap for Level 3 to interconnect. In fact, former Chairman Powell  
3 recognized the ILEC incentives when he stated, "At times, as I have observed, it is  
4 tempting to play the regulatory "game" in the way the incumbents often do. Begging  
5 for regulatory protection. Seeking regulatory favoritism that raises the costs of your  
6 competitors."<sup>9</sup>

7 **Q. WHY WOULD IT BE INEFFICIENT TO REQUIRE A COMPETITOR TO**  
8 **INTERCONNECT AT MANY DIFFERENT POINTS ON THE ILEC'S**  
9 **NETWORK?**

10 A. In economic terms, the location of the ILEC's switches reflects a series of choices  
11 made over a period of decades about the placement of multiple switches as compared  
12 to the use of transport from a smaller number of switches to reach subscribers. In the  
13 past when switching was relatively cheap and transmission was relatively expensive,  
14 it made sense to have lots of dispersed switches, with relatively short transport links  
15 between switches and to subscribers. Today, however – although the costs of both  
16 switching and transport have declined over time – switching is relatively expensive  
17 and transmission is relatively cheap, and it makes economic sense to have a small  
18 number of switches and relatively long transmission links to customers. So, even if it  
19 was perfectly efficient and rational for an ILEC to deploy a particular set of switches  
20 at various locations in the past, that does not remotely mean that it would be efficient

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<sup>9</sup> Prepared Remarks of Michael K. Powell, Before the Association of Local Telecommunications Services; "Local Competition...CLECs in the Midst of an Explosion." Convention, Las Vegas, Nevada; December 2, 1998.

1 and rational for a CLEC to duplicate those choices today, given the technologies  
2 available today and the particular geographic distribution of the CLEC's customers.

3 **Q. DOES THE ACT RECOGNIZE THESE DIFFERENCES BETWEEN ILECS**  
4 **AND CLECS?**

5 A. Yes. The 1996 Act recognizes this by giving the CLEC, not the ILEC, the choice of  
6 where to interconnect as long as it is technically feasible. Section 251(c)(2) of the  
7 Act says that the CLEC can choose to exchange traffic at "any technically feasible  
8 point" within the ILEC's network. The criterion is technical feasibility, not the  
9 economic impact – albeit minimal - on the ILEC of having to carry its traffic to or  
10 from the technically feasible point selected.

11 **Q. PLEASE EXPLAIN WHY IT MAKES SENSE FOR THE CLEC TO HAVE**  
12 **THE DISCRETION TO SELECT POIS AND NOT THE ILEC.**

13 A. It makes perfect economic sense, in light of the principles discussed above, to give  
14 the choice of where to locate a POI or POIs to the CLEC and not the incumbent.<sup>10</sup> As  
15 noted above, the incumbent built out its network over many years in response to a  
16 wide variety of then existing economic, technological and demographic conditions. It  
17 would be irrational to assume that a competitor would find it economic to re-create  
18 anything like the same network today, even to serve the same customer base — and  
19 of course no competitor will have the kind of ubiquitous customer base as the ILEC.

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<sup>10</sup> Indeed, footnote 464 of the *Local Competition Order* states, "Of course, requesting carriers have the right to select points of interconnection at which to exchange traffic with an incumbent LEC under section 251(c)(2)." Many orders since the *Local Competition Order* have supported the CLEC right to have only one POI per LATA.

1 It follows that, where it is economically reasonable for the CLEC to establish multiple  
2 POIs at multiple points on the ILEC's network, it will do so. In fact, Level 3 has a  
3 history of working closely with the ILECs in the establishment of additional POIs  
4 where traffic warrants such additional facilities. But where it does not choose to  
5 establish multiple POIs, that is solid evidence that there is no economic reason to  
6 require it to do so. To the contrary, forcing the CLEC to take account of the ILEC's  
7 network architecture choices — beyond requiring the POI to be “within” the ILEC's  
8 network — essentially forces the legacy network design choices and the inefficiencies  
9 of the ILEC onto the CLEC.

10 **Q. AS YOU UNDERSTAND THE FCC'S RULES, DO ILECS SUCH AS QWEST**  
11 **HAVE THE RIGHT TO SELECT POIs?**

12 **A.** No. As just noted, that right is limited to CLECs and does not extend to ILECs. The  
13 FCC explained that this is so because the ILEC “has the incentive to discriminate  
14 against its competitors by providing them less favorable terms and conditions of  
15 interconnection than it provides itself.”<sup>11</sup> Eventually, of course, the hope is that  
16 CLEC networks become sufficiently robust such that the erstwhile dominant ILEC  
17 literally cannot afford to treat CLECs badly: “competition eventually will eliminate  
18 the ability of an incumbent local exchange carrier to use its control of bottleneck local  
19 facilities to impede free market competition.”<sup>12</sup>

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<sup>11</sup> See *Local Competition Order* at ¶ 218.

<sup>12</sup> *Id.* at ¶ 4.

1     **Q.     ARE YOU SAYING THAT A CLEC, SUCH AS LEVEL 3, WILL ALWAYS**  
2     **ESTABLISH A SINGLE POI IN A LATA?**

3     A.    No. The specifics will vary from case to case, but depending on the traffic mix and  
4     where the CLEC already has facilities, it may well make sense for the CLEC to  
5     establish more than one POI in a LATA. The point, however, is that the choice has to  
6     be with the CLEC, not the ILEC. This is because the ILEC will always want to force  
7     the CLEC to interconnect at points that are favorable to the ILEC and its legacy  
8     network. From my economic perspective, it is clear that the FCC was correct when it  
9     recognized the ILEC incentives and abilities at paragraph 10 of the *Local Competition*  
10    *Order* wherein it states in pertinent part:

11           Because an incumbent LEC currently serves virtually all subscribers in  
12           its local serving area, an incumbent LEC has little economic incentive  
13           to assist new entrants in their efforts to secure a greater share of that  
14           market. An incumbent LEC also has the ability to act on its incentive  
15           to discourage entry and robust competition by not interconnecting its  
16           network with the new entrant's or by insisting on supracompetitive  
17           prices or other unreasonable conditions for terminating calls from the  
18           entrant's customers to the incumbent LEC's subscribers.

19  
20    **Q.    HAS LEVEL 3 ESTABLISHED MORE THAN ONE POI PER LATA IN**  
21    **CERTAIN AREAS?**

22    A.    Yes. In the past, Level 3 has negotiated interconnection agreements that provide for  
23    additional POIs if demand or other circumstances merited such an investment.  
24    However, establishing additional POIs should be based on the need for such  
25    additional POIs, and on traffic patterns, not on Qwest's attempts to force inefficient  
26    costs onto Level 3. Moreover, just because Level 3 may have multiple POIs in

1 certain LATAs does not mean that Level 3 should be forced to add POIs in every  
2 LATA at Qwest's discretion. To the contrary, from an economic perspective, the fact  
3 that in some cases Level 3 has voluntarily established multiple POIs, but in other  
4 cases has not, simply confirms that it is not efficient to require Level 3 to mirror  
5 Qwest's network architecture. Rather, this fact demonstrates, on the basis of actual  
6 market behavior, that Level 3 needs flexibility to establish one or more POIs where it  
7 is efficient to do so. Qwest's proposal would not give Level 3 that flexibility.

8 The Commission should be extremely wary of establishing any obligations in  
9 an interconnection agreement that would require Level 3 to deploy significant  
10 amounts of capital in situations where Level 3 would not independently find doing so  
11 in its interest. Since the implosion of the competitive telecommunications industry in  
12 2000, it has become increasingly difficult for CLECs to attract capital; investors are  
13 understandably wary of this sector. SBC has asserted in testimony filed in other state  
14 arbitrations that more than 200 CLECs have ceased operations in SBC territory since  
15 2000. I have no reason to think that the numbers would be any different for Qwest's  
16 territory. Forcing CLECs to build or lease facilities, where margins are slim or  
17 nonexistent, simply to require the CLEC to duplicate the ILEC's legacy network,  
18 would only worsen CLEC prospects for attracting capital. Such a result would be  
19 inefficient from both an economic and operational standpoint and has consequently  
20 been regularly rejected by regulators as not in the public interest. The likely result of  
21 such a requirement would not be more CLEC investment; it would be fewer CLECs

1 entering the market because the regulatorily-imposed capital requirements do not  
2 justify the investment.

3 **Q. BUT REGARDLESS OF THE FCC RULES AND ECONOMIC PRINCIPLES**  
4 **DISCUSSED ABOVE, ISN'T IT UNFAIR TO QWEST TO GIVE LEVEL 3**  
5 **THE CHOICE OF WHERE AND WHETHER TO ESTABLISH POIs?**

6 A. Not at all. As discussed elsewhere in my testimony, the ILEC is entitled to be paid  
7 for the work it does in terminating traffic it receives from the CLEC at a single POI or  
8 multiple POIs, just as the CLEC is entitled to compensation for terminating traffic its  
9 receives from the ILEC. Although this point is sometimes obscured by the FCC's  
10 \$0.0007 rate for ISP-bound traffic, the FCC's rules for reciprocal compensation  
11 provide for a higher level of payment if traffic has to be routed through an ILEC  
12 tandem switch to get to the appropriate end office than if the traffic does not have to  
13 go through the tandem switch.<sup>13</sup>

14 It is not "unfair" to Qwest to have to bear certain costs arising from its status  
15 as an incumbent; or, rather, if it is "unfair," that "unfairness" is simply a means to

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<sup>13</sup> Under the FCC's rules for compensation for ISP-bound calling, an ILEC may choose to avoid paying reciprocal compensation rates for calls its customers make to ISPs by opting into the FCC's special regime for such traffic. Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, Inter-Carrier Compensation for ISP-Bound Traffic, *Order on Remand and Report and Order*, 16 FCC Rcd 9151 (2001) at ¶¶ 89-93. If the ILEC does so it only has to pay \$0.0007 per minute for calls its customers make to ISPs. But if the ILEC chooses to protect itself economically by electing to only *pay* \$0.0007 per minute for ISP-bound traffic, it is obliged to accept all traffic from the competitor network for termination at the same \$0.0007 rate, whether that traffic is delivered at a tandem, at an end office, or elsewhere. So it is probably true that Qwest would not get any higher payment from Level 3 for traffic Level 3 delivers at the tandem (or elsewhere) as compared to at the end office. But that is only because *Qwest* has chosen to protect itself from having to pay full reciprocal compensation rates for ISP-bound traffic by opting into the FCC's regime. From this perspective, giving up additional tandem-based compensation for inbound traffic is part of the price Qwest has chosen to pay in exchange for paying less for outbound ISP-bound traffic.

1           compensate for the fact that it was “unfair” to the public and to potential competitors  
2           to allow Qwest to operate in a monopoly environment for many decades prior to the  
3           enactment of the 1996 Act. A policy decision to promote competition, such as that  
4           embodied in the 1996 Act, necessarily and inevitably means that certain advantages  
5           that would otherwise accrue to the incumbent are being taken away.

6           Obviously an ILEC such as Qwest does not benefit from accommodating  
7           Level 3 in its efforts to attract customers, and would like to charge Level 3 as much as  
8           possible for whatever it is called upon to do. That is simply rational behavior by a  
9           monopolist trying to hold on to its monopoly position. The reason interconnection  
10          agreements are subject to statutory standards as to their content, and regulatory  
11          oversight via the arbitration process, is precisely to allow regulators such as this  
12          Commission to *prevent* the ILEC from refusing to reasonably accommodate CLECs  
13          and to charge CLECs too much for what the ILEC has to do.

14          In this regard, a useful model to consider is what would happen if there were  
15          three competing carriers in an area, each serving one third of the customer base, with  
16          each carrier’s customers equally valuable to the others. In this competitive situation,  
17          if any one of the carriers remained unconnected, it would suffer terribly in the  
18          marketplace, and so each carrier would be highly motivated to establish efficient  
19          interconnection with the others, at some convenient point to all three. None of them  
20          would be in a position to dictate to the others where interconnection would occur, and  
21          none of them would be in a position to demand that the others pay for its own costs of  
22          running its network. Obviously we do not have anything like this kind of competitive

1 situation today, but this hypothetical model provides a good reference point for what  
2 makes sense in establishing interconnection arrangements under the 1996 Act.

3 Whenever Qwest makes a demand for multiple POIs, or for Level 3 to have to  
4 pay for the privilege of terminating traffic originated by Qwest's customers, or for  
5 Level 3 to split its traffic among different trunk groups based on Qwest's preferred  
6 categorization when one trunk group would be more efficient, it is reasonable to ask  
7 whether one of our three hypothetical equally-sized competitive carriers could ever  
8 hope to get its two competitors to agree to such a thing. If not, then it's a pretty good  
9 bet that Qwest isn't being reasonable but, instead, is trying to abuse its position as the  
10 dominant provider of services.

11 **Q. PLEASE SUMMARIZE YOUR TESTIMONY REGARDING ESTABLISHING**  
12 **A SINGLE POI.**

13 A. Competitors using new technology should not be limited by the historic decisions of  
14 Qwest network planners who established switch locations and local calling areas  
15 decades ago based upon the more limited technology available to them. Those  
16 decisions, even if justifiable and supportable then, would certainly be different today  
17 given the changes in technology. As such, forcing competitors to conform to the  
18 ILEC's legacy network topology would be inconsistent with the goals of the *Local*  
19 *Competition Order* and the Act. Rather, the promotion of efficient markets dictates  
20 that a competitor such as Level 3 only be required to interconnect in a specific area  
21 where its own assessment of traffic volumes, customer demand, and available  
22 technology justify investment in facilities needed to reach that area. Level 3 should

1 not be required to extend its facilities to POIs unilaterally identified by Qwest;  
2 instead, Qwest is obligated to provide interconnection for Level 3 facilities at POIs  
3 which Level 3 properly determines best serve its network architecture and business  
4 plans. This concept actually allows Qwest to continue to design a network around its  
5 own needs, while allowing Level 3 to do the same thing.

6 **Q. HOW SHOULD THE COMMISSION DECIDE THIS ISSUE?**

7 A. The Commission should adopt Level 3's position which permits the flexibility of a  
8 single POI per LATA and reject Qwest's proposed language.

9  
10 **Q. WHAT TYPES OF TRAFFIC SHOULD BE EXCHANGED OVER THE**  
11 **PHYSICAL INTERCONNECTION FACILITIES ESTABLISHED AT ANY**  
12 **GIVEN POI?**

13 A. Any and all traffic should be exchanged over the physical facilities at a given POI. It  
14 is economically irrational to require the establishment of different physical facilities  
15 for different "types" of traffic when one facility will handle the traffic efficiently.

16 **Q. IS THIS CONCLUSION LIMITED TO WHETHER THE TRAFFIC FALLS**  
17 **INTO THE REGULATORY CATEGORY OF "TELECOMMUNICATIONS"**  
18 **OR NOT?**

19 A. No. Once a POI has been established, Qwest should be required to use that POI (and  
20 should be required to permit Level 3 to use that POI) for the exchange of all types of  
21 traffic, whether they are classified as "telecommunications services," "information  
22 services," "local services," "access services," "251(b)(5) traffic," or anything else.

1 Assuming that transmitting a particular type of traffic over a given physical facility is  
2 technically feasible, it makes no economic sense to require the establishment of  
3 additional, duplicative facilities based on the regulatory classification of the traffic.  
4 As I noted above, the FCC recognized as much at the very inception of competition  
5 under the 1996 Act: once a physical interconnection arrangement has been  
6 established for any type of traffic for which such an arrangement is properly called  
7 for under the Act, the competitor is permitted to use that same physical arrangement  
8 to deliver other types of traffic as well, even including traffic for which  
9 interconnection might *not* be legally required.<sup>14</sup> The express policy behind this  
10 requirement is to prevent ILECs from forcing competitors to establish duplicative  
11 physical facilities for which there is no independent technical or economic need.  
12

### 13 Issue 2: Separate Trunking

14 **Q. PLEASE SUMMARIZE THE DISPUTE REGARDING SEPARATE**  
15 **TRUNKING.**

16 A. Mr. DuCloo provides technical testimony on this point. Very briefly, a trunk is a  
17 single transmission path between switching systems, and a trunk "group" is a number  
18 of trunks similarly configured to act together to carry traffic between the same two  
19 end points. While more traffic requires more trunks in a trunk group, as Mr. DuCloo  
20 explains, the number of trunks needed to handle the traffic does not rise at the same  
21 rate as the traffic. It does not take twice as many trunks to handle twice as much

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<sup>14</sup> See *Local Competition Order* at ¶ 995.

1 traffic; it takes fewer than twice as many. Traffic engineering is similar for  
2 telecommunications and road design. You can gain efficiencies in handling traffic by  
3 adding trunks (or lanes on a highway), but the relationship is not one to one. These  
4 efficiencies are important to controlling costs for both the ILEC and the CLEC.

5 **Q. PLEASE EXPLAIN.**

6 A. By efficiencies, I mean that the more traffic that can be included within a single trunk  
7 group, the less money it costs both carriers to handle the traffic. On the other hand,  
8 for any given volume of traffic between two switches, the more trunk groups into  
9 which the traffic is subdivided, the more expensive it becomes at the margin to carry  
10 it.

11 Given this, Level 3, understandably, wants to include all of the traffic  
12 exchanged between any given Qwest switch and Level 3 on a single trunk group.  
13 From an economic perspective, the technical "trunking efficiencies" noted above  
14 guarantee that a single large trunk group will be the most economically efficient  
15 solution. Qwest, however, wants to require that the traffic to and from a particular  
16 Qwest switch be routed over separate trunk groups based not on the technical  
17 characteristics of the traffic, but rather on the regulatory classification of the traffic.  
18 This makes no economic sense, and Qwest's position should be rejected.

19 Adding insult to injury, not only does Qwest want Level 3 to artificially divide  
20 traffic into different trunk groups based on economically irrelevant (for these  
21 purposes) regulatory classifications, Qwest wants to *charge* Level 3 for establishing  
22 these separate trunk groups. Qwest is entirely responsible for the cost of getting its

1 traffic to Level 3; and, while Level 3 is entirely responsible for paying Qwest  
2 intercarrier compensation for terminating Level 3-originated traffic, that  
3 compensation is set on a per-minute basis and does not entail Qwest charging Level 3  
4 for setting up trunks at all.

5 **Q. HOW WOULD LEVEL 3 BE DISADVANTAGED BY THE LANGUAGE**  
6 **PROPOSED BY QWEST?**

7 A. As Mr. DuCloo explains at page 22 of his testimony, under Qwest's proposal, Level 3  
8 will have to spend more on switch programming, trunk administration, trunk ports on  
9 switches, digital cross-connect systems, and fiber optic terminals; and at some point  
10 will have to spend more on switches themselves. There is no operational or economic  
11 justification for imposing these costs on CLECs. Their only purpose would be to  
12 disadvantage CLECs vis-a-vis Qwest. In fact, Qwest's proposal would increase its  
13 own costs as well. I urge the Commission to reject Qwest's proposal.

14 **Q. ARE THERE OPERATIONAL PROBLEMS ASSOCIATED WITH LEVEL 3**  
15 **USING TRUNKS TO CARRY BOTH LOCAL AND TOLL TRAFFIC?**

16 A. No. As Mr. DuCloo explains, there are no technical or operational problems  
17 associated with Level 3's proposal to combine different "types" of traffic on a single  
18 trunk group that would be avoided by separate trunks. Requiring separate trunk  
19 groups, as suggested by Qwest, results in a deadweight economic loss to society, as I  
20 noted earlier.

1     **Q.     IS THERE ANY JUSTIFICATION FOR REQUIRING SEPARATE TRUNKS**  
2     **FOR DIFFERENT TYPES OF TRAFFIC?**

3     A.    No. Qwest says that traffic subject to different billing rates should be put onto  
4     separate trunks in order to keep the billing straight, but that makes no sense from an  
5     economic perspective either.

6     **Q.     WHY NOT?**

7     A.    There is a simple, inexpensive way to keep the billing straight that does not entail the  
8     significant network inefficiencies of separate trunking. All that is needed is for the  
9     parties to periodically sample the traffic going between them and develop factors for  
10    how much is subject to reciprocal compensation, how much to access charges, etc.  
11    Then all that is required is to keep track of the total minutes exchanged in a given  
12    month, apply the factors, and determine the appropriate bill. Mr. DuCloo addresses  
13    this in his testimony as well.

14    **Q.     HAVE THESE FACTORS BEEN USED IN THE PAST FOR BILLING**  
15    **PURPOSES?**

16    A.    Yes. These billing factors have been used for decades with great success.

17    **Q.     HAVE OTHER REGULATORS ACCEPTED THE FACT THAT BILLING**  
18    **CAN BE ACCOMPLISHED USING FACTORS RATHER THAN**  
19    **INEFFICIENT SEPARATE TRUNKS?**

20    A.    Yes. The use of factors to allocate traffic on a particular facility or trunk into  
21    different billing categories has a long history in the telecommunications business  
22    going back at least as far as the early 1980s, when "other common carriers" used

1 business lines to connect to the network to provide their competing long distance  
2 services. Eventually they became known as "Feature Group A" lines, and the  
3 industry agreed to certain assumptions regarding total traffic on such lines and on  
4 how much of the traffic was interstate versus intrastate.

5 Since the passage of the 96 Act, commissions have approved the use of  
6 jurisdictional factors that allows the efficient use of interconnection trunks. For  
7 instance, the Michigan Public Service Commission found in a Sprint/Ameritech  
8 arbitration proceeding that:

9 It appears to the Commission that economic entry into the market  
10 requires that Sprint be permitted to use its existing trunks for *all* traffic  
11 whenever feasible.<sup>15</sup> (emphasis added) In Texas, the Commission there  
12 ordered Verizon to allow Sprint to carry local, intrastate intraLATA  
13 and intrastate interLATA traffic on the same trunks.<sup>16</sup> Other states,  
14 such as Indiana, have required the use of PLUs (percentage local  
15 usage) or other allocators (e.g., PIUs – percent interstate usage) to  
16 reflect the jurisdiction of traffic on such trunks for billing purposes.<sup>17</sup>

17 **Q. OTHER THAN BILLING, IS THERE ANY OTHER ARGUMENT FOR**  
18 **QWEST TO REQUIRE SEPARATE TRUNKING ARRANGEMENTS FOR**  
19 **DIFFERENT TYPES OF TRAFFIC?**

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<sup>15</sup> In the Matter of the Application of Sprint Communications Company, L.P. for Arbitration to Establish an Interconnection Agreement with Ameritech Michigan, MPSC Case No. U-11203, Order Approving Arbitration Agreement with Modifications, Jan 15, 1997.

<sup>16</sup> Texas Public Utility Commission; *In the Matter of the Petition of Sprint for Arbitration with Verizon*; Docket No. 24306; Final Order Modifying Arbitration Award and Approving Interconnection Agreement; dated February 17, 2004.

<sup>17</sup> Indiana Utility Regulatory Commission; *In the Matter of AT&T Petition for Arbitration with Indiana Bell Telephone Company*; Cause No. 40571-INT-03; November 20, 2000. Further, in its Revised Response to Level 3 Request No. 22 in the Illinois arbitration, SBC Illinois stated, "SBC Illinois uses a PLU methodology to distinguish local versus intraLATA toll in cases where the CLEC does not provide calling party number (CPN) information."

1 A. No, in fact, Qwest would be disadvantaging itself by requiring CLECs to separate  
2 traffic of different types onto multiple trunk groups rather than carrying all traffic on  
3 a single trunk group. To put it simply, not only is it most efficient for Level 3 to  
4 carry all traffic on a single trunk group, it is efficient from Qwest's perspective as  
5 well. *Both* parties would have to pay extra for trunk ports, switch capacity, etc., if  
6 traffic is artificially forced onto separate trunk groups.

7 **Q. WHY WOULD QWEST INSIST ON CONTRACT LANGUAGE THAT**  
8 **WOULD BE DISADVANTAGEOUS TO ITSELF?**

9 A. I cannot answer for Qwest, but it would appear that Qwest is willing to absorb costs  
10 in the short term in order to disadvantage or drive its competitors from the  
11 marketplace.<sup>18</sup> This is, of course, totally contrary to the public interest in the  
12 development of efficient competitive telecommunications networks, but might well  
13 be rational from the perspective of Qwest's private interest. This is particularly true  
14 if, as Mr. DuCloo notes, Qwest has excess capacity of trunk ports on its switches. If  
15 Qwest has already invested in an excessive number of trunk ports (perhaps due to  
16 overly aggressive estimates of growth of traffic on its network), then it will, in effect,  
17 have trunk ports "lying around" unused. This would create a situation in which the  
18 short-run cost to Qwest of requiring inefficient trunking is relatively small, while the  
19 cost to Level 3 of using inefficient trunking would be large. Qwest could therefore

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<sup>18</sup> Given the fragile nature of the competitive telecommunications industry, it would take very little to eliminate facilities-based competition. As such, any decision that disadvantages competitors as compared to Qwest will further diminish the chances for effective competition.

1 engage in the classic monopolist's strategy of increasing competitors' costs at very  
2 little cost to itself by seeking and obtaining a regulatory obligation on competitors to  
3 use inefficient trunking. This is entirely rational behavior from Qwest's perspective  
4 of trying to maximize shareholder wealth through protection of its monopoly, but of  
5 course it makes no sense at all from the perspective of the public interest.

6 **Q. WHAT ARE YOUR RECOMMENDATIONS REGARDING THIS ISSUE?**

7 A. I recommend that the Commission adopt Level 3's position and allow it to carry  
8 different types of traffic on one trunk group. Qwest's proposed language would result  
9 in the inefficient use of the network, additional costs to all carriers, and give an unfair  
10 competitive advantage to Qwest.

11 **Issue 3 – VNXX, ISP-Bound Traffic and RUF**

12  
13 **Q. PLEASE INTRODUCE THESE ISSUES.**

14 A. The ISP-bound traffic and virtual NXX issues are very much intertwined. By way of  
15 background, ISPs providing dial-up service receive local calls from their customers in  
16 order to allow those customers to access the Internet. ISPs do not market and do not  
17 expect to receive long distance calls from customers seeking to connect to the Internet  
18 because long distance calls have traditionally had per-minute charges associated with  
19 them.<sup>19</sup> Thus, making long-distance calls to ISPs is uneconomical for end users. For

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<sup>19</sup> Of course it is technically possible for a person to use a long-distance call to connect to his or her ISP. The point of this testimony is that experience has shown that consumers are not willing to pay long-distance charges to access the Internet.

1 the ISP, this means that it is important for end users to be able to reach the ISP by  
2 means of a local call.

3 It is, however, terribly inefficient for an ISP to establish a physical presence in  
4 each and every ILEC-established local calling area where the ISP might have  
5 customers or where it might want to attract customers. Therefore, it is quite common  
6 — I would go so far as to call it the standard operating arrangement in the industry —  
7 for ISPs to obtain telephone numbers from CLECs or ILECs that are “local” to areas  
8 where they have customers. Because the CLECs or ILECs are providing local  
9 numbers for the ISPs, where they have no local presence, the service is referred to as  
10 virtual NXX or VNXX service, and is in essence identical to the FX service offered  
11 by Qwest, at least from a end user customer perspective.

12 **VNXX for ISP-Bound Traffic**

13 **Q. DOES THE ISP HAVE FACILITIES IN EACH OF THE LOCAL CALLING**  
14 **AREAS WHERE THEY HAVE LOCAL NUMBERS?**

15 A. Not usually. As noted above, it would be very expensive for the ISPs to put their own  
16 facilities in the many thousands of local calling areas around the country. Instead,  
17 they purchase local services from carriers like Qwest and Level 3 in those areas  
18 where they have or desire customers.

19 **Q. DOES LEVEL 3 PROVIDE SUCH A SERVICE TO ISPS? AND, IF SO,**  
20 **WHAT IS IT CALLED?**

21 A. Yes. Level 3 sells its direct inward dial (“DID”) service to ISPs where it is a  
22 certificated CLEC. This service arrangement is usually referred to as “virtual NXX,”

1 or "VNXX" service. It is just another name for the functionality that has been  
2 provided for decades by ILECs under the name "foreign exchange," or "FX" service.  
3 Mr. DuCloo describes FX service in his testimony.

4 **Q. DOES QWEST PROVIDE FX SERVICE IN ARIZONA?**

5 A. Yes. In response to Level 3 Request No. 024, Qwest indicated that it does offer FX  
6 service in Arizona. Qwest also provided its Arizona tariff for FX service. (See  
7 Exhibit TJG-2)

8 **Q. PLEASE EXPLAIN THE MARKET FOR VNXX SERVICE.**

9 A. Where ISPs, such as Earthlink or AOL, want to offer dial-up Internet access, they  
10 contact an ILEC or CLEC to purchase local service. In Level 3's situation, the ISP  
11 subscribes to Level 3's DID service and is assigned local numbers from the Level 3  
12 switch in the exchanges where dial-up service is being offered and where Level 3  
13 offers service. The ISPs advise their customers of the numbers that the ISPs have  
14 been assigned, who then program the numbers into their computers for accessing the  
15 Internet. The customers' computers then dial these local numbers; the calls are routed  
16 from the ILEC to Level 3 in exactly the same manner as other local calls; and Level 3  
17 delivers the calls to the ISP being called.

18 **Q. PLEASE EXPLAIN HOW THE VNXX CALLS ARE ROUTED IN THE**  
19 **NETWORK.**

20 A. Actually, "VNXX" calls are routed in exactly the same way as non-VNXX local  
21 calls. There is nothing special about these calls.

22 **Q. PLEASE EXPLAIN.**

1     A.     Assume that Level 3 has a single POI in a LATA located at a Qwest tandem in  
2           Phoenix. Assume further that Level 3 serves all of its ISPs who have customers in  
3           that LATA from a single switch that Level 3 uses to serve the entire LATA. Now  
4           assume that a customer of one of those ISPs, who takes telephone exchange service  
5           from Qwest, uses his or her computer's modem to connect to the ISP. In that case,  
6           Qwest's switch will receive the number as dialed by its customer, recognize it as a  
7           Level 3 number, and direct the call to a trunk group that connects to Level 3's POI.  
8           Level 3 then accepts the traffic and routes it to its switch and then on to its ISP  
9           customer. This is the same manner in which all local calls are routed.

10    **Q.     IF THIS CALL HANDLING IS THE SAME AS ALL LOCAL CALLS THEN**  
11       **WHAT IS THE DISPUTE BETWEEN QWEST AND LEVEL 3?**

12    A.     *If* the Qwest customer making the call happens to be in the same Qwest retail  
13           originating local calling area as the ISP's equipment, then Qwest would say that the  
14           call is "local" and there is no dispute. On the other hand, if the ISP's gear is in a  
15           different Qwest retail local calling area, Qwest says that the call is a "VNXX" call  
16           and is not local.

17    **Q.     DOES THE LOCATION OF THE ISP EQUIPMENT IMPACT THE**  
18       **JURISDICTION OF THE CALL, THE HANDLING OF THE CALL, OR THE**  
19       **COST OF GETTING THE CALL TO THE POI?**

20    A.     No. Qwest's responsibilities, and costs, are absolutely identical regardless of the  
21           location of the ISP equipment. In each case, a locally dialed call is routed to the POI  
22           for termination. All that Qwest does is determine that the dialed telephone number is

1 a Level 3 number and ship the call off to Level 3 on an appropriate trunk group. And,  
2 what Level 3 does is the same in both cases: it recognizes the incoming traffic as  
3 bound for one of its customers and sends the traffic on to that customer. The only  
4 difference is whether the ISP's gear receiving the call is at the end of a short circuit  
5 (close to Level 3's switch, and thus often not in the calling party's retail local calling  
6 area) or a longer circuit (away from Level 3's switch, and thus, possibly, in the  
7 calling party's retail local calling area). Regardless of the distance, it is Level 3's  
8 responsibility to complete the call. In other words, it is Level 3 and **not** Qwest that is  
9 providing the Level 3 ISP customer with the FX-like functionality. It makes no  
10 economic sense whatsoever to make any distinction in Qwest's financial obligations  
11 depending on whether Level 3 uses a long or short circuit to connect its customers to  
12 its switch.

13 As the discussion above (I hope) illustrates, from an economic perspective,  
14 Qwest's proposal is completely arbitrary and irrational. There is simply no sound  
15 economic basis upon which to distinguish these two situations.

16 **Q. IS THE ROUTING OF VNXX CALLS DIFFERENT IN ANY WAY FROM**  
17 **THE ROUTING OF ANY OTHER LOCAL CALL?**

18 **A.** No. As described above, and by Mr. DuCloo, it is exactly the same.

19 **Q. DO THE PHYSICAL END POINTS OF THE CALLS HAVE ANY IMPACT**  
20 **ON QWEST'S RESPONSIBILITIES OR COSTS?**

1 A. No. In response to Level 3 Request No. 023, Qwest stated in pertinent part, "The  
2 costs Qwest incurs do not vary based upon the physical location of the Level 3  
3 customer." (See Exhibit TJG-3)

4 **Q. IS QWEST'S PROPOSAL CONSISTENT WITH THE HISTORICAL**  
5 **HANDLING OF LOCALLY-DIALED CALLS?**

6 A. No. As Mr. DuCloo explains, Qwest is actually trying to invent a new way to classify  
7 calls that has no operational or historical basis in the telephone network. Qwest's  
8 proposal is to rate and distinguish traffic based on the actual physical location of  
9 customers as opposed to the numbers the customers are assigned. This flies in the  
10 face of the way calls have been rated since the establishment of the PSTN. What's  
11 really going on here is that it is more efficient for a new competitor like Level 3 to  
12 offer FX-like services to ISPs than it is for Qwest to do so, leading to ISPs "voting  
13 with their feet" and moving their business to competitors like Level 3. Qwest is  
14 essentially trying to recoup its losses in the marketplace, and to punish its  
15 competitors, for being willing and able to offer a more efficient serving arrangement  
16 to the ISPs.

17 **Q. DID QWEST AGREE IN DISCOVERY THAT CALLS ARE NOT RATED**  
18 **BASED ON THE ACTUAL PHYSICAL LOCATION OF CUSTOMERS?**

19 A. Yes. In response to Level 3 Request No. 082, Qwest said that, "The telephone  
20 numbers that Qwest uses for call routing purposes are assigned to its end users based  
21 on NPA-NXXs associated with specific LCAs in the state." (See Exhibit TJG-4)  
22 This is consistent with Level 3's position in this proceeding. Qwest also noted

1 correctly that "...switches do not route calls based on specific addresses stored within  
2 the switches...." (Id.) Indeed, neither Qwest's tariffs nor its switches contain  
3 customer specific location information that would be required to implement Qwest's  
4 proposal in this proceeding.

5 **Q. ARE THERE NEGATIVE CONSEQUENCES ASSOCIATED WITH**  
6 **QWEST'S PROPOSAL TO TREAT VNXX CALLS AS SOMETHING OTHER**  
7 **THAN LOCAL CALLS?**

8 A. Yes. Qwest's proposal would impose substantial additional costs on ISPs. If Level 3  
9 is required to pay access charges for calls it receives to its ISP customers who use  
10 VNXX services (or is denied intercarrier compensation for such calls), Level 3's cost  
11 of doing business will increase and it may have to raise its rates to its ISP customers.  
12 In order to deal with those rate increases, the ISP customers will either have to deploy  
13 otherwise unnecessary and inefficient facilities so that their equipment actually is in  
14 the calling parties' local calling areas (thereby relieving Level 3 of some of the  
15 economic burdens caused by Qwest's proposal), or keep the efficient equipment  
16 arrangement but be subject to the higher costs. Either way, the ISPs may have to  
17 raise rates to their customers, and, particularly for some areas, may simply decline to  
18 provide dial-up access, in order to minimize costs. This is plainly contrary to the  
19 public interest.

20 Moreover, Qwest's proposal to not pay reciprocal compensation on calls to  
21 customers who are not "physically located" in the same local exchange, or require toll  
22 treatment for such calls, would give Qwest yet another competitive advantage over

1 CLECs. Qwest's proposal would improperly benefit its own affiliated ISPs, increase  
2 the cost of Internet access and reduce competition to the detriment of consumers and  
3 the economy.<sup>20</sup> Qwest's proposal would put in jeopardy any competition for ISP dial-  
4 up services, thereby depriving consumers of choice in what has become an  
5 indispensable information, education and economic tool, especially for those still  
6 significant portions of customers who cannot yet afford the costs of dedicated  
7 broadband connections to the Internet.

8 **Q. ARE THERE ANY ADDITIONAL NEGATIVE CONSEQUENCES**  
9 **ASSOCIATED WITH QWEST'S PROPOSAL?**

10 A. Yes. In developing its multi-billion dollar nationwide network, Level 3 did not  
11 simply duplicate the network of Qwest and other ILECs. Instead, Level 3 has  
12 deployed a softswitch technology-based network which is much less capital intensive,  
13 and much more location insensitive than traditional ILEC networks. Using this  
14 advanced technology, Level 3's network is designed to operate most efficiently by  
15 serving large regions of the country on an integrated basis. It is indifferent to ILEC  
16 legacy central office boundaries. By taking advantage of such technology shifts,  
17 competitors such as Level 3 can participate in the natural progression of market  
18 development, perhaps even "pulling even" with ILECs who, by virtue of the presence  
19 of their existing networks have incredible inherent market advantages. Qwest's

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<sup>20</sup> Qwest has yet to answer Level 3 Request No. 004. In other states, however, such as Colorado, Qwest has two affiliates offering Internet access services: Qwest Communications Corporation and Qwest Enterprise America, Inc. I would expect those affiliates offer services in Arizona as well.

1           proposal would therefore at least partially negate efficiencies Level 3 designed into its  
2           network — which efficiencies Level 3 continues to invest in, as demonstrated by its  
3           recent decision to upgrade its network with optical equipment capable of carrying up  
4           to 400 gigabits per second over a single fiber strand. These efficiencies are of no use  
5           to anyone, however, if Qwest is permitted to burden Level 3 with such arbitrary and  
6           unwarranted interconnection and compensation provisions.

7           **Q. DOES LEVEL 3'S SERVICE PROVIDE THE SAME FUNCTIONALITY FOR**  
8           **CONSUMERS AS THE FX AND FX-TYPE SERVICES PROVIDED BY**  
9           **QWEST AND OTHER ILECS?**

10          A. Yes. As Mr. DuCloo explains, functionally Level 3's VNXX service is identical to,  
11          and competes with, traditional ILEC FX services. In trying to obtain a regulatory  
12          ruling that would make VNXX service uneconomic for the major class of consumers  
13          who use that service (ISPs), Qwest is trying to enlist the regulators in an effort to  
14          stamp out this type of competition. This Commission should reject that invitation.

15          **Q. DOES QWEST OFFER ISPS A SERVICE SIMILAR TO VNXX SERVICE?**

16          A. Yes. In addition to standard offerings such as FX, Qwest offers its "Wholesale Dial"  
17          service. According to its online literature, Qwest's service "provides a secure,  
18          reliable, cost-effective dial-up network infrastructure solution for ISPs. The service  
19          provides the ISPs' end users with seamless dial-up functionality that remains  
20          transparent." One of the benefits touted by Qwest is the availability of "local access

1 telephone numbers.”<sup>21</sup> So, as you can see, this is yet another example of services  
2 provided to ISPs for the purpose of providing local dial-up access for consumers in  
3 areas where the ISPs may or may not have a physical presence.

4 **Q. YOU NOTED EARLIER THAT QWEST WANTS TO IMPOSE ACCESS**  
5 **CHARGES ON LEVEL 3 IN CONNECTION WITH CALLS THAT QWEST**  
6 **CUSTOMERS MAKE TO ISPS SERVED VIA VNXX NUMBERS. IS THERE**  
7 **ANY ECONOMIC RATIONALE FOR DOING SO?**

8 A. No. FX/VNXX service is a “local” service to which access charges do not apply.  
9 Instead, the VNXX calls are ISP-bound calls that terminate (from Qwest’s  
10 perspective) at the POI. Neither Qwest nor Level 3 imposes any sort of toll charge in  
11 connection with calls to VNXX numbers. As a result, there is no economic basis on  
12 which any sort of “access charge” could be imposed.

13 **Q. DOES QWEST APPLY ACCESS CHARGES TO ITS FX OR FX-TYPE**  
14 **SERVICES?**

15 A. No. A quick review of the relevant tariffs shows that access charges are not applied  
16 to any portion of the ILEC FX service. Further, in response to Level 3 Request No.  
17 1-029, Qwest indicated that, calls to and from end users in the local calling area  
18 where the FX customer purchases an FX connection are treated as local. (See  
19 Attachment TG-1) As such, Qwest does not apply access charges to its FX service.

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<sup>21</sup> See “Qwest Wholesale Dial” in its Product Catalog. <http://www.qwest.com/pcat>

1     **Q.     WHAT WOULD BE THE ECONOMIC EFFECT OF ADOPTING QWEST'S**  
2     **PROPOSAL?**

3     A.     It would simply eliminate an efficient and technologically advanced means of  
4     providing dial-up Internet access to customers throughout the State of Arizona. This  
5     would obviously be counter to the public interest.

6     **Q.     IS DIAL-UP ACCESS TO THE INTERNET IMPORTANT TO THE STATE**  
7     **OF ARIZONA?**

8     A.     Yes. Dial-up for Internet access is the universal service equivalent of a primary line  
9     for voice service. In other words, not all people can afford broadband access to the  
10    Internet, but most people have a single line with which they can access the Internet  
11    over a dial-up connection. Dial-up access is especially important where broadband  
12    connections are not yet available.

13           Rural residents report less broadband availability than their counterparts in  
14    suburban or urban areas of the United States. In fact, a Pew Internet & American Life  
15    Project study found that rural residents were two to five times more likely to not have  
16    broadband availability than urban and suburban residents.<sup>22</sup> Pew research associate  
17    Peter Bell also noted:

18           While gaps in income and age appear to be partly responsible, the  
19    difficulty of getting Internet access remains a big barrier for many  
20    rural users. Major Internet service providers accounted for about 40  
21    percent of use among rural residents, whose most frequent reason for  
22    choosing an ISP was that it was the only one available to them. In

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<sup>22</sup> See Pew Internet & American Life Project; Rural Areas and the Internet; "Rural American's Internet Use Has Grown, But They Continue to Lag Behind Others"; February 17, 2004.

1 contrast, online users in metropolitan areas usually chose from a range  
2 of providers by seeking the best deal.<sup>23</sup>  
3

4 Although dial-up Internet access is critical in rural areas, as a percentage of the total,  
5 it is decreasing. While DSL and cable broadband connections showed large  
6 increases, from 2001 to 2003 dial-up Internet access actually decreased by 12.7  
7 percent. The same study showed that in rural areas 74.7 percent of the Internet  
8 connections were dial-up connections.<sup>24</sup>

9 **Q. IS DIAL-UP STILL AN IMPORTANT SOURCE OF INTERNET ACCESS IN**  
10 **ARIZONA?**

11 A. Yes. Although broadband is growing dramatically and dial-up is becoming a smaller  
12 proportion of the total, in Phoenix as of December of 2004, 31.6 percent of Internet  
13 access was by dial-up and 68.4 percent was by broadband.<sup>25</sup>

14 **Q. DESPITE THE DOWNWARD TREND IN DIAL-UP ACCESS, DO YOU**  
15 **THINK IT WILL REMAIN AN IMPORTANT TYPE OF INTERNET**  
16 **ACCESS?**

17 A. Yes. As I mentioned above, dial-up is critical to rural consumers where broadband is  
18 not always available and competitive alternatives are limited. Garry Betty,  
19 Earthlink's chief executive stated,

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<sup>23</sup> See, TodaysSeniorsNetwork.com; "Rural use of Internet continue to lag, Costs, access remain barriers, new data shows."; June 7, 2005.

<sup>24</sup> See, "A Nation Online: Entering the Broadband Age"; U.S. Department of Commerce, Economics and Statistics Administration, National Telecommunications and Information Administration; September, 2004, at 5, 13.

<sup>25</sup> See, ClickZ Stats; Global Broadband Tops 123M, September 17, 2004. (<http://www.clickz.com/stats/sectors/broadband/article.php/3409671>)

1 Despite compelling reasons to switch to broadband, dial-up lines will  
2 always have a place in American homes. Customers in rural areas  
3 where broadband is not available will continue to log on via a dial-up  
4 connection; other people may prefer the simplicity of dial-up.<sup>26</sup>  
5

6 For those citizens of Arizona that can't either afford or don't have available to them  
7 broadband connectivity, dial-up internet provides access to one of – if not the -  
8 cornerstone of economic and community vitality. The ability to apply for jobs, get  
9 weather reports, crop price forecasts on a real time basis, participate in educational  
10 endeavors, gain community information on safety and health, and communicate via e-  
11 mail to friends and businesses, form the very fabric of commerce in the world we live  
12 in. Non-participation or lack of access, simply stated, sentences portions of our  
13 society to second class status. Without vigorous competition to ensure low cost dial-  
14 up Internet access, both the citizens of Arizona and the State itself will suffer  
15 irreparable harm as a significant segment of the population is unable to compete  
16 economically, advance educationally and establish community ties.

17  
18 **Q. IT IS SOMETIMES SUGGESTED BY ILECS THAT INDUSTRY**  
19 **NUMBERING GUIDELINES PROHIBIT THE ASSIGNMENT OF NUMBERS**  
20 **FOR FX OR SIMILAR SERVICES. IS THAT TRUE?**

21 **A. No. In fact Section 2.14 of the Numbering Guidelines specifically identifies FX**  
22 **services as being eligible for number assignment:**

23 2.14 It is assumed from a wireline perspective that CO Codes/blocks  
24 allocated to a wireline service provider are to be utilized to provide

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<sup>26</sup> See, The New York Times, "Dial-up Internet Going the Way of Rotary Phones"; June 21, 2005.

1 service to a customer's premise physically located in the same rate  
2 center that the CO codes/blocks are assigned. **Exceptions exist, for**  
3 **example tariffed services such as with the exception of foreign**  
4 **exchange service.** <sup>27</sup> (emphasis added)  
5

6 If it were improper or a violation of the guidelines to use virtual NXX codes then all  
7 ILECs currently providing FX and FX-type services would be in violation today.

8 **Q. WHAT ARE NXX NUMBER BLOCKS?**

9 A. NXX number blocks are groups of numbers assigned to carriers for distribution to  
10 customers. The blocks contain 10,000 numbers, or where number pooling is in place,  
11 blocks of 1,000 numbers. The NXX codes are the fourth through sixth digits of a ten-  
12 digit telephone number. For instance, the NXX code for my telephone number (303-  
13 424-4433) is 424. These codes are used as rate center identifiers for rating and  
14 routing of calls.

15 **Q. MUST A CARRIER BE LOCAL NUMBER PORTABILITY ("LNP")**  
16 **CAPABLE TO PARTICIPATE IN NUMBER POOLING?**

17 A. Yes. Level 3 is LNP capable and able to participate in number pooling. Further,  
18 Level 3 normally utilizes only numbers in the 4,000 block within a 10,000 block. By  
19 not contaminating the numbers in the other thousand blocks, should jeopardy occur  
20 and pooling be imposed, Level 3 could return numbers to the administrator.

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<sup>27</sup> Alliance for Telecommunications Industry Solutions; Sponsor of Industry Numbering Committee; Central Code (NXX) Assignment Guidelines; Released May 28, 2004.; hereinafter referred to as "Numbering Guidelines".

1     **Q.     HOW ARE CARRIERS ASSIGNED AN NXX CODE?**

2     A.     Carriers who meet the criteria for the assignment of central office codes, like Level 3  
3           and Qwest, request and are assigned blocks of telephone numbers by the numbering  
4           administrator.<sup>28</sup> The numbers are loaded into Level 3's switch and referenced in the  
5           Local Exchange Routing Guide ("LERG") for routing by other carriers. Level 3 then  
6           assigns numbers from within those blocks to its customers as requested.

7     **Q.     HOW IS THE RATING OF CALLS IMPACTED BY THE NUMBERS**  
8           **ASSIGNED TO CUSTOMERS?**

9     A.     Standard industry practice and procedure provides that each NXX code is associated  
10           with a particular rate center within a local calling area. A single rate center may have  
11           more than one NXX code, but each code is assigned to one and only one rate center.  
12           This uniquely identifies the end office switch serving the NXX code, so that each  
13           carrier that is routing a call knows which end office switch to send the call to.

14    **Q.     IS IT UNCOMMON FOR NXX CODES TO BE ASSIGNED TO CUSTOMERS**  
15           **WHO ARE NOT PHYSICALLY LOCATED IN THE LOCAL CALLING**  
16           **AREA WHERE THE NXX IS "HOMED" OR ASSIGNED?**

17    A.     No. It is also not uncommon for the "routing" point for an NXX code to differ from  
18           the "rating" point for the same code. In other words, although an NXX may be rated  
19           or homed to a specific end office switch, the routing information in the LERG may  
20           specify that calls to that NXX code be routed to a different wire center, for instance, a  
21           tandem.

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<sup>28</sup>     See Numbering Guidelines, Section 4.0.

1     **Q.    IS IT IMPROPER OR AGAINST ANY RULES FOR CLECS TO PROVIDE**  
2     **NUMBERS TO THEIR CUSTOMERS?**

3     A.    No, not at all. In fact, as noted above, carriers must request numbers in order to  
4     provide service in a particular exchange. Based on my review of Level 3's practices,  
5     Level 3 utilizes and abides by the Numbering Guidelines.<sup>29</sup> In fact, Level 3 has  
6     developed its own LNP solution and has established stringent guidelines that result in  
7     very efficient use of numbering resources.

8     **Q.    PLEASE SUMMARIZE YOUR TESTIMONY ON VNXX TRAFFIC.**

9     A.    VNXX traffic is a competitive response to ILEC FX service and is the primary  
10    service used by ISPs to provide local dialing for their customers. Calls to VNXX  
11    numbers are local calls in every sense of the phrase and do not impose any additional  
12    costs or responsibilities on Qwest. The CLEC assignment of numbers in exchanges  
13    where they serve is completely consistent with the industry numbering guidelines.  
14    Qwest's proposal to impose access charges on these calls should be rejected.

15           **Relative Use Factor**

16    **Q.    PLEASE DESCRIBE THE DISPUTE BETWEEN THE PARTIES**  
17    **REGARDING THE "RELATIVE USE FACTOR," OR "RUF."**

18    A.    Prior to recent FCC rulings, it was commonplace for some CLECs to call on the ILEC  
19    to establish a transmission facility (often called an "entrance facility") running from  
20    some point on the ILEC's network to the CLEC's switch location. In its original

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<sup>29</sup>     The Numbering Guidelines require compliance as a condition of receiving numbers.

1 ruling regarding interconnection under the 1996 Act,<sup>30</sup> the FCC addressed the  
2 question of rates applicable to “transmission facilities that are dedicated to the  
3 transmission of traffic *between* two networks” (emphasis added), and ruled that the  
4 cost should be apportioned in accordance with relative use of the facility. In cases  
5 where a CLEC obtained an entrance facility from the ILEC to connect to the CLEC’s  
6 switch, the effect of this rule (which remains embodied in 47 CFR § 51.709(b)) was  
7 to reduce the ILEC’s charges for the entrance facility based on what proportion of the  
8 traffic going over it was ILEC-originated, as opposed to CLEC-originated. This is,  
9 generally speaking, what the “RUF” is intended to capture (although Qwest’s  
10 particular language does not properly track the FCC’s rule). The FCC’s *Triennial*  
11 *Review Remand Order*, however, held that entrance facilities were no longer to be  
12 provided — at least not at TELRIC-based rates — for these purposes.<sup>31</sup> This suggests  
13 that even Qwest would not think that the RUF would apply between the parties.

14 **Q. WOULD A RUF APPLY FOR FACILITIES ON EITHER SIDE OF THE POI?**

15 A. No. RUF logically applies in the case of a “meet point” interconnection at a POI.  
16 The very definition of a “meet point” or POI-based form of interconnection is that  
17 each party bears its own costs for the facilities needed to get to the POI. The FCC in  
18 the *Local Competition Order* specifically recognized that each party is responsible for  
19 its own costs in getting to a meet point, and expressly found that it is perfectly  
20 reasonable to require the ILEC to build out new facilities at its own expense, at least

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<sup>30</sup> See *Local Competition Order* at ¶ 1062.

<sup>31</sup> See FCC **Order on Remand** in WC Docket No. 04-313, CC Docket No. 01-338, Released February 4, 2004 at ¶ 137.

1 to some extent, to accommodate a meet point interconnection.<sup>32</sup> Level 3 seeks to  
2 interconnect with Qwest at a single meet-point POI per LATA. It follows that there  
3 will not *be* any situations in which there are “transmission facilities that are dedicated  
4 to the transmission of traffic between” Level 3 and Qwest. Instead, the two networks  
5 will *meet* at a particular *point*, with no inter-network facilities, per se, at all. Each  
6 party will be responsible for the costs of its own facilities up to the POI, which will  
7 constitute a “meet point” as the FCC used that term.

8 **Q. WHAT IS LEVEL 3’S CONCERN WITH THE RUF?**

9 A. Level 3 is concerned that Qwest is trying to use the “RUF” concept to avoid the  
10 economic logic of establishing a meet-point POI. Level 3 is concerned, specifically,  
11 that even with a single POI, Qwest will try to assign some of the costs of its own  
12 network on its side of the POI to Level 3, based in some way on the amounts of  
13 traffic that Qwest sends Level 3 and vice versa. That is unreasonable in and of itself.

14 **Q. ASSUMING THERE WAS A REASON TO MAKE A RUF CALCULATION,**  
15 **DOES QWEST PUT FORTH A CORRECT ALGORITHM?**

16 A. No. Qwest gets it wrong on the calculation, by seeking to unfairly and unreasonably  
17 exclude the substantial volumes of ISP-bound traffic it sends to Level 3 from  
18 calculating the “relative use” of the facilities it uses to deliver that traffic. As  
19 described below, there is no basis for excluding ISP-bound traffic from any RUF  
20 calculation that might be appropriate in light of the way Level 3 and Qwest actually  
21 interconnect.

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<sup>32</sup> See *Local Competition Order* at ¶ 553.

1     **Q.     WHY IS THIS A CONTENTIOUS ISSUE?**

2     A.     It is contentious because of the traffic flows. A significant amount of the traffic  
3           exchanged between Qwest and Level 3 will be calls originated by Qwest customers  
4           for termination to Level 3 customers. The Level 3 customers tend to be ISPs. The  
5           one-way nature of this type of traffic means that Qwest would pay for the vast  
6           majority of the interconnection facilities assuming such a calculation were to be  
7           made.

8     **Q.     IS THAT UNFAIR?**

9     A.     No. To the contrary, it is completely consistent with the economic rule of cost-  
10          causation and the accounting concept of matching. It is the Qwest customers who are  
11          originating the calls to the Level 3 customers. As such, Qwest is originating the  
12          traffic and causing the use and consequent costs of the network facilities. As such,  
13          the cost causer – Qwest – should pay for the costs. Further, Qwest customers are  
14          paying local rates to make those calls. As such, Qwest has both the revenues and the  
15          costs associated with the calls. To foist those costs on Level 3 while only Qwest  
16          enjoys the revenues would violate the matching principle. It would be unfair and  
17          inequitable for Qwest to impose those costs on Level 3.

18               Perhaps an example would help clarify the situation. In some cities, people  
19          must pay tolls to travel on roads. The tolls supposedly pay for the cost of the roads.  
20          Now suppose a new amusement park is opened and traffic on the toll roads to that  
21          amusement park is significant. Forcing the amusement park to pay the tolls  
22          associated with the peoples' choice to visit the amusement park would be unfair.

1 After all, the people decided to visit the amusement park and they decided to drive to  
2 the facility. It was their decision to go and as such, they are the cost-causers with  
3 respect to the tolls.

4 Forcing Level 3 to pay for the Qwest facilities when Qwest originates the vast  
5 majority if not all of the calls, would be like charging the amusement park for the cost  
6 of getting the people to the park. Qwest customers purchase Qwest local service and  
7 decide to make the calls and it is Qwest's obligation – under the reciprocal  
8 compensation rules – to pay Level 3 for the cost of terminating those calls. Rule  
9 51.703(b) specifically states that "a LEC may not assess charges on any other  
10 telecommunications carrier for local telecommunications traffic that originates on the  
11 LEC's network."<sup>33</sup>

12 Note in this regard that one of the effects of consumer demand for dial-up  
13 Internet access was to lead consumers to purchase additional telephone lines into their  
14 homes in order to allow the consumers to use dial-up Internet access while also  
15 engaging in voice telephone conversations on the other line. These second lines have  
16 almost exclusively been provided by the ILEC. As time goes on, of course, more and  
17 more people are switching from dial-up to broadband Internet access, which will  
18 simultaneously (from Qwest's perspective) lower second line revenues, increase DSL  
19 revenues, and lower intercarrier compensation payments for ISP-bound traffic. But  
20 looking only at the dial-up segment, Qwest has received and will continue to receive  
21 substantial additional revenues, in the form of second line revenues, in connection

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<sup>33</sup> 47 C.F.R., §51.703(b).

1 with its customers' calls to ISPs. Given this, any claim that Qwest has been or is  
2 being economically harmed by delivering ISP-bound calls without receiving access  
3 charges, or any claim that Qwest cannot afford to pay intercarrier compensation with  
4 respect to such calls, must therefore be viewed with great skepticism.

5 **Q. IS QWEST'S POSITION CONSISTENT WITH 47 C.F.R. § 51.703(B)?**

6 A. No. This rule is very straightforward and simple in its reading. Qwest may not assess  
7 charges on any other telecommunications carrier for telecommunications traffic that  
8 originates on its network. Qwest's position is just the opposite. Qwest wants to  
9 exclude the ISP-bound traffic, even though it is originated by its own customers, from  
10 the relative use calculation. There is simply no support for that position and it is  
11 clearly contrary to the existing rules and the economic principles of cost causation.

12 **Q. IS THERE ANY OTHER REASON TO EXCLUDE ISP-BOUND TRAFFIC**  
13 **FROM THE RELATIVE USE CALCULATION?**

14 A. No. Again, it is clear that RUF calculations are not appropriate in a POI situation.  
15 But if for some reason the Commission were to decide to apply the RUF, ISP traffic  
16 must be included in the calculation. Simply because the calls are directed to an ISP  
17 does not change the fact that these are locally dialed telecommunications calls that  
18 traverse the circuit switched network in exactly the same fashion as any other local  
19 call. The effect of Qwest's mathematical manipulation of the formula is to transfer to  
20 Level 3 a large portion of the costs of delivering Qwest-originated traffic. There is  
21 simply no economic, engineering or public policy reason to exclude the traffic from  
22 the calculation.

1     **Q.     PLEASE SUMMARIZE YOUR POSITION ON THE RELATIVE USE**  
2     **CALCULATION.**

3     A.     There is no need to apply a RUF calculation on each side of the POI since each party  
4     is responsible for getting its traffic to the POI. Nevertheless, if a RUF calculation is  
5     made it must include the ISP-bound traffic. The traffic is telecommunications traffic  
6     originated by Qwest customers and, as such, is the responsibility of Qwest.

7  
8     **Issue 4 – VoIP**

9     **Q.     PLEASE INTRODUCE THIS ISSUE AND THE DISPUTE BETWEEN**  
10    **LEVEL 3 AND QWEST.**

11    A.     IP-Enabled services, such as IP-enabled voice traffic -- the most common form of  
12    which is referred to as voice over Internet protocol or VoIP -- are becoming more  
13    common as they offer significant efficiencies from both an economic and network  
14    operations perspective. Qwest and Level 3 disagree on the proper regulatory  
15    treatment of these services. To the extent that this Commission has regulatory  
16    authority over any aspect of these services, Level 3 urges the Commission take a  
17    “hands-off” approach to regulation. As described below, VoIP constitutes a form of  
18    “enhanced” or “information” service, like Internet access, so that under existing FCC  
19    rules it would not be appropriate for such services to be subject to access charges in  
20    any event. But putting aside that point, from an economic perspective it would be a  
21    mistake to subject VoIP services to traditional access charges, whether or not it would  
22    be permissible to do so from a legal or regulatory perspective. In contrast, Qwest

1 encourages the Commission to treat these services like traditional long distance calls,  
2 and impose access charges on this traffic, unless the VoIP provider's point of  
3 presence is in the same local calling area as the called party.

4 **Q. WHAT IS VOICE OVER INTERNET PROTOCOL OR "VOIP" TRAFFIC?**

5 A. Mr. DuCloo discusses this in more detail. Briefly, VoIP services involve using the  
6 same network that carries Internet traffic to carry packetized voice communications.  
7 Because voice data packets can be dispersed among other types of Internet traffic,  
8 such as e-mail messages, web pages, Instant Messaging conversations, music  
9 downloads from iTunes or similar services, etc., VoIP doesn't use as much bandwidth  
10 as in a circuit-switched network. This makes phone calls essentially as cheap to  
11 transmit as e-mail.<sup>34</sup> Indeed, VoIP is a good example of the convergence of  
12 computers, telephones and television into a single and more efficient integrated  
13 information environment.

14 **Q. PLEASE DESCRIBE THE FUNDAMENTAL DIFFERENCES BETWEEN**  
15 **VOIP CALLS AND TYPICAL PSTN CALLS.**

16 A. In the simplest of terms, VoIP is an information service application that uses the  
17 Internet backbone and discrete data packets to deliver real-time voice  
18 communications. Rather than voice information being transmitted across the  
19 traditional circuits of the PSTN, VoIP uses the Internet Protocol, and the Internet  
20 backbone, or some other private IP network. In addition to this difference in

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<sup>34</sup> See Comments of VON Coalition in CC Docket No. 01-92, WC Dockets No. 02-361, 03-211, 03-266, 04-36; filed August 19, 2004, at page 2.

1 transmission, VoIP calling, being IP-enabled, facilitates the introduction and  
2 integration all sorts of potential capabilities not present with PSTN circuit switched  
3 calls.<sup>35</sup> From a regulatory perspective the IP-based capabilities distinguish VoIP – an  
4 information service – from basic circuit-switched telecommunications services.

5 **Q. IS QWEST OFFERING VOIP SERVICES TODAY?**

6 A. Yes. On December 8, 2004, Qwest announced that its VoIP service (Qwest  
7 OneFlex™) is available to business customers nationwide. In that same press release  
8 Qwest noted that it offers a range of VoIP solutions including OneFlex™ Integrated  
9 Access, OneFlex™ Hosted VoIP and IP Centrex Prime.<sup>36</sup>

10 **Q. HAS QWEST ADMITTED IN DISCOVERY THAT ITS ONEFLEX™**  
11 **SERVICE PROVIDES UP TO FIVE VIRTUAL NUMBERS THAT ALLOW**  
12 **PEOPLE TO CALL THE SUBSCRIBER ON A LOCAL INSTEAD OF A**  
13 **TOLL BASIS?**

14 A. Yes. I have attached Qwest's Response to Level 3 Request No. 1-063S1, in which  
15 Qwest admits that Qwest Communications Corporation ("QCC") does offer  
16 OneFlex™ with virtual numbers. (See Exhibit TJG-5)

17 **Q. HOW DOES QWEST PRICE ITS QWEST ONEFLEX SERVICE?**

18 A. In Response to Level 3 Request No. 1-65, Qwest admitted that QCC offers its VoIP  
19 service for approximately \$30 per month, plus 5 cents per minute for long-distance

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<sup>35</sup> For instance, when you have a missed call on Vonage service, you get an email detailing the call information (time, calling number, etc.). The features and capabilities of VoIP services are many and expanding.

<sup>36</sup> See Qwest Press Release entitled, "Qwest Launches Expanded Nationwide VoIP Service for Businesses." Released December 8, 2004.

1 calls with a \$2.99 month fee. The offering also includes a full range of features,  
2 including caller ID and voice mail. (See Exhibit TJG-6)

3 ILECs and CLECs alike are offering VoIP and other IP-Enabled services. For  
4 instance, and as discussed above, Qwest also offers its "Wholesale Dial" service.  
5 Qwest's service provides many of the same benefits and features as Level 3's service,  
6 including local dialing for dial-up Internet access. In fact, Qwest notes that its service  
7 provides a dial-up network architecture "...covering 85 percent of the U.S. population  
8 with a local call."<sup>37</sup>

9 **Q. IS THERE ANY ECONOMIC JUSTIFICATION FOR TREATING LEVEL 3'S**  
10 **SERVICES FOR ESPs THAT PROVIDE VOIP APPLICATIONS LIKE**  
11 **TYPICAL TELEPHONE SERVICES?**

12 **A.** No. As noted by the FCC in its IP-Enabled Services NPRM, "Dial-up, or  
13 narrowband, Internet access utilizes the same PSTN infrastructure that telephone  
14 subscribers use to place traditional circuit-switched voice calls."<sup>38</sup> Broadband VoIP  
15 services do not impose any additional costs on the ILECs or their network either. As  
16 such, treating these services as if they were traditional long distance  
17 telecommunications services, and imposing their associated access charges, would  
18 allow ILECs to over-recover their network costs. At the same time, imposing these  
19 high call origination and termination rates on this new technology would suppress the  
20 use of the new services and, effectively, tax a new, efficient competitor for the benefit

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<sup>37</sup> See <<http://www.qwest.com/wholesale/pcat/wholesaledial.html>>.

<sup>38</sup> See FCC Notice of Proposed Rulemaking; WC Docket No. 04-36; Released March 10, 2004, FN 32.

1 of the legacy, incumbent operator. Such a result would not only constitute a windfall  
2 for ILECs, but it would impede the natural efficiency of the market by unnecessarily  
3 burdening the development of new services. There is simply no economic  
4 justification for treating IP-Enabled services as if they were traditional services.

5 **Q. IS THERE PRECEDENT IN THE TELEPHONE INDUSTRY FOR**  
6 **ADOPTING POLICIES THAT INSULATE NASCENT, INNOVATIVE**  
7 **TECHNOLOGIES FROM BEARING AN UNDUE PORTION OF THE COSTS**  
8 **OF THE LEGACY NETWORK?**

9 A. Yes. In fact, the FCC has repeatedly recognized that encouraging innovation in this  
10 industry requires exempting nascent technologies and industry segments from  
11 providing support to the legacy network. One of the earliest examples of this policy  
12 dates from the 1970s and early 1980s. Historically, all customer premises equipment  
13 ("CPE") had been provided to customers by the regulated telephone company as part  
14 of telephone service. In the 1960s the FCC ruled (in a famous case called  
15 *Carterphone*) that the Bell System could not forbid the attachment of "foreign"  
16 devices that did not harm the network.<sup>39</sup> In response, the Bell System grudgingly  
17 permitted non-Bell CPE to be connected to the network, but imposed charges for  
18 "protective connecting arrangements" on that new CPE. The FCC responded to this  
19 anticompetitive tactic by establishing network interconnection specifications that

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<sup>39</sup> The *Carterphone* case started as a court case and the FCC (Docket Nos. 16942, 17073) then found the AT&T tariff to be unreasonable in that it prohibited the use of interconnection devices (the *Carterphone*) which did not adversely affect the telephone system. See FCC 68-661, Adopted June 26, 1968. I do not cite to this case for legal reasons, but only to show that unreasonable interconnection requirements are not in the public interest.

1 applied to all CPE – Bell and non-Bell alike – and then by requiring the Bell System  
2 to provide all CPE on an unregulated basis, through a separate subsidiary. This  
3 allowed the then-nascent competitive CPE market to develop without having to pay a  
4 “legacy network tax” to the Bell System.

5 Another example of protecting nascent technologies and services from  
6 supporting the legacy network is the “ESP Exemption” from access charges. In 1983  
7 the FCC ruled that even though interstate traffic to and from enhanced service  
8 providers could, logically, be subject to per-minute access charges, those charges  
9 would not apply. The explicit basis for this ruling was that this new market should  
10 not be required to pay rates that include subsidies for the traditional network. As  
11 noted above, I believe that this exemption directly applies to VoIP; but whether it  
12 literally applies or not, the *policy* behind it applies with full force here. VoIP is a  
13 nascent technology. There are many different forms of these services. Different  
14 entities are pursuing different technical and business strategies with respect to it.  
15 While we should not ask legacy network operators like Qwest to provide explicit  
16 subsidies to these new services, neither should we ask the new services to provide  
17 subsidies to legacy network operators like Qwest. It follows, from an economic  
18 perspective, that VoIP services should be permitted to interconnect with the legacy  
19 network at low, cost-based rates (either Section 251(b)(5) reciprocal compensation

1 rates or the FCC-established \$0.0007 rate), rather than requiring those services to pay  
2 subsidy-laden access charges.<sup>40</sup>

3 Still another example is the FCC's treatment of interconnection between  
4 landline LECs and wireless carriers. The FCC has long sought to encourage the  
5 growth of wireless services, free from the traditional constraints of the legacy  
6 network. In the *Local Competition Order* the FCC advanced this goal by establishing  
7 extremely broad geographic regions within which traffic exchanged between landline  
8 and wireless carriers would be viewed as "local" and thus not subject to access  
9 charges.<sup>41</sup> As a result of this ruling, a call from a wireless customer in western  
10 Wisconsin to a landline customer in North Dakota (or vice versa) is "local," as is a  
11 call from southern Arizona to southeastern South Dakota (or vice versa). Even  
12 though these calls would be treated as "long distance" calls within the traditional  
13 landline network, the wireless carrier only has to pay the low reciprocal compensation  
14 rate when it is the originating carrier, and the wireless carrier gets paid that rate — as  
15 opposed to paying originating access charges — when it is the terminating carrier.  
16 This decision to exempt large amounts of "long distance" wireless traffic from  
17 traditional access charges is, from an economic perspective, an explicit policy  
18 decision by the FCC — and one of which I completely approve — to exempt this

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<sup>40</sup> Even though interstate access rates have been declining over time, they are still well above what an economist would view as a cost-based rate. To be cost-based from an economic perspective requires that a rate be in line with forward-looking incremental cost. Intercarrier compensation rates developed in connection with Section 251(b)(5) and ISP-bound calling reflect this approach; traditional access rates do not.

<sup>41</sup> *Local Competition Order* at ¶ 1036. See also 47 C.F.R. § 51.701(b)(2).

1 relatively new, growing technology from having to pay subsidies to support the  
2 legacy network.

3 Just as sound regulatory policy exempted ESPs and wireless carriers from  
4 having to support the legacy network by paying access charges, so too sound  
5 regulatory policy supports exempting VoIP services from them as well. Again, this is  
6 true from an economic perspective independent of whether, as a legal or regulatory  
7 matter, the so-called "ESP Exemption" literally applies to VoIP traffic.

8 **Q. HAS THE FCC STATED ANY POSITIONS REGARDING THE ECONOMIC**  
9 **IMPACT OF REGULATING VOIP?**

10 A. Yes. Former FCC Chairman Powell maintained this support for leaving IP-Enabled  
11 services unregulated at the FCC Forum on Voice over Internet Protocol in  
12 Washington, where he was quoted as saying, "As one who believes unflinchingly in  
13 maintaining an Internet free from government regulation, I believe that IP-based  
14 services such as VoIP should evolve in a regulation-free zone." Then Chairman  
15 Powell went on to caution regulators with respect to IP-Enabled services' regulation,  
16 saying "No regulator, either federal or state, should tread into this area without an  
17 absolutely compelling justification for doing so."<sup>42</sup> Chairman Powell's statements  
18 were part of a daylong forum to address business, technical, service feature and  
19 policy issues. Consistent with those statements, Chairman Powell stated,

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<sup>42</sup> Opening Remarks of FCC Chairman Michael K. Powell at the FCC Forum on Voice over Internet Protocol (VoIP) December 1, 2003 – Washington, D.C.

1           The burden should be placed squarely on government to demonstrate  
2           why regulation is needed, rather than on innovators to explain why it is  
3           not.”<sup>43</sup>

4           **Q.     CAN YOU DISCUSS FURTHER WHY THE “HANDS-OFF” APPROACH BY**  
5           **THE FCC HAS BEEN SO SUCCESSFUL?**

6           A.    Yes. By refraining from regulating technology, the FCC has eliminated the  
7           uncertainty that regulation sometimes imposes on the industry. This has allowed the  
8           capital markets and industry players to develop business plans and to invest capital to  
9           meet consumer demand.

10           It is very difficult for companies to develop products and technology when  
11           faced with a patchwork of regulatory requirements. The balkanization of the  
12           regulatory landscape increases not only the costs of compliance – if what constitutes  
13           compliance can even be determined – but also embeds an unacceptable level of  
14           inefficiency resulting from an inability to achieve economies of scale – economies of  
15           scale that the ILECs have enjoyed throughout their life cycle by virtue of their  
16           monopoly hold on the market. In other words, there should be one unified regulatory  
17           approach to VoIP services and technology, not a 50-state patchwork of regulation.

18           **Q.     ARE YOU SUGGESTING THAT THE STATES SHOULD SIMPLY FOLLOW**  
19           **THE LEAD OF THE FCC?**

20           A.    No. But the Federal approach has been very successful, so the states should seriously  
21           consider what benefits would derive from imposing multiple and perhaps wildly

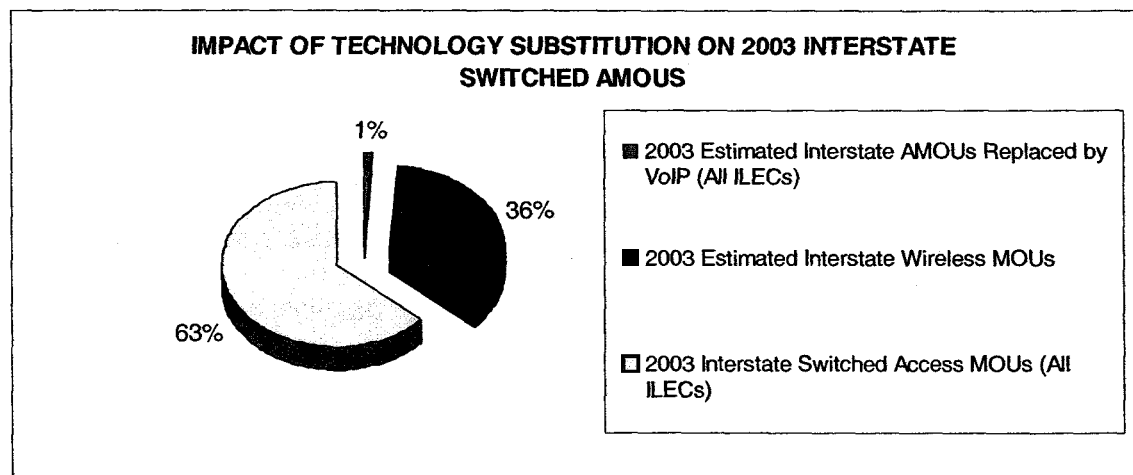
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<sup>43</sup> See, US News & World Report, “Courting Calls – Telecom and Cable Firms Scramble to Offer Internet Calls”; by Mary Kathleen Flynn; Feb 2, 2004.

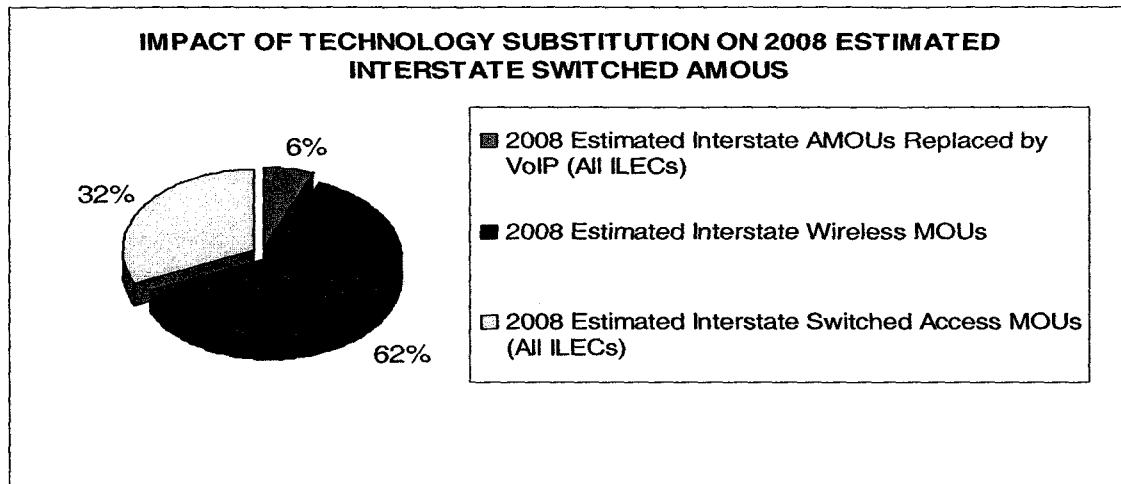
1           varying regulatory paradigms of their own. The Commission should maintain  
2           Arizona's current policy of not applying access charges on IP-Enabled traffic until the  
3           FCC completes its investigations in the NPRMs (*Developing a Unified Intercarrier*  
4           *Compensation Regime*, CC Docket No. 01-92 and *IP-Enabled Services*, WC Docket  
5           No. 04-36). The information gathered in the FCC proceedings will be useful in the  
6           evolving policy debate at the state level.

7           **Q. IS IP-ENABLED OR VOIP TRAFFIC A SIGNIFICANT PART OF THE**  
8           **TOTAL TRAFFIC IN THE UNITED STATES?**

9           A. No, but it is a growing percentage. In the two charts below, a comparison of various  
10          technologies is provided for 2003 and for 2008.<sup>44</sup> The first chart shows VoIP minutes  
11          were about one percent of total switched minutes of use in 2003. In the second chart,  
12          we see projected 2008 VoIP minutes to be about six percent of the total.



<sup>44</sup> These charts and their underlying data were taken from publicly available research sources and compiled for use in FCC Docket Nos. 04-36, 03-266.



At the same time, we see dramatic increases in the projected amount of wireless minutes of use. So, while VoIP is getting significant attention today, the volumes and revenues associated with that traffic are not yet significant. Further, to the extent substitution is occurring in the market, the majority of that substitution is occurring because of wireless and not VoIP.

**Q. WON'T ILECS BE HARMED BY NOT RECEIVING ACCESS CHARGES ON IP-ENABLED TRAFFIC, EVEN IF THAT TRAFFIC IS A SMALL PERCENTAGE OF THE TOTAL?**

**A.** No. First of all, as discussed above, the traffic to date is *de minimis*. Second, Qwest is being fully compensated for the traffic, albeit at a lower rate.

**Q. IF QWEST AND THE OTHER RBOCS WERE CORRECT ABOUT THE IMPACT ON REVENUES AND EARNINGS, WOULD THAT JUSTIFY REGULATION OF IP-ENABLED SERVICES?**

**A.** No. Neither the ILECs' dire predictions of reduced local revenue (as market share shifts to VoIP providers), nor their dire predictions of all long distance traffic moving

1 to VoIP to avoid access charges, even if they were correct, would justify common  
2 carrier regulation of IP-Enabled services. Moreover, as Verizon's Chief Executive  
3 Officer Seidenberg has stated: "Our view is to let cannibalization occur."<sup>45</sup>  
4 Seidenberg has said that while VoIP probably would reduce Verizon's local phone  
5 market share from 90% to 60%, Verizon plans to participate in VoIP both as a  
6 backbone provider and as an ISP, "meaning more revenue per customer."<sup>46</sup>

7 **Q. HAS QWEST SUPPORTED THE FEDERAL "HANDS OFF" APPROACH TO**  
8 **IP-ENABLED SERVICES?**

9 A. Yes. Qwest has supported the FCC's position against regulation of voice  
10 communications over the Internet. In an article dated December 5, 2003, Qwest's  
11 CEO said, "...it would be inconsistent for the commission to regulate what's known  
12 as "voice over Internet protocol" (VoIP) service when similar services, such as  
13 telephone via cable connection and wireless phones, are not regulated." He went on  
14 to note that Qwest was launching its VoIP service in Minnesota and that VoIP could  
15 be more profitable to the company than traditional phone service, because it does not  
16 have the added costs of regulation.<sup>47</sup>

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<sup>45</sup> Communications Daily, (June 20, 2001).

<sup>46</sup> *Id.*

<sup>47</sup> "Qwest Chief Backs Up FCC on Voice Over Internet"; Denver Post, Dec 5, 2003.

1     **Q.     HAVE ILECS ARGUED IN THE PAST THAT, IN THE ABSENCE OF**  
2     **ACCESS CHARGE REVENUES, RATEPAYERS WOULD BE NEGATIVELY**  
3     **IMPACTED?**

4     A.     Yes. The faulty premise of the previous RBOC argument has been that the impact of  
5     VoIP would negatively impact RBOC margins, resulting in the need for RBOCs to  
6     increase local rates. Today, however, as discussed above, the RBOCs are rapidly  
7     deploying VoIP services and embracing the new technology. Indeed, the RBOCs are  
8     supporting the FCC decision to not regulate these services, in part because of their  
9     offerings. In fact, on Qwest's website it boasts about its IP network and its ability to  
10    provide "mission critical applications" such as VoIP:

11           For years, Qwest's state-of-the-art IP network has been transferring  
12           voice and data across the globe for businesses of all sizes. The Qwest  
13           network has the capacity and advanced capabilities to support today's  
14           mission critical applications such as Voice over IP (VoIP), as well as  
15           bandwidth-intensive business applications such as Enterprise Resource  
16           Planning, Customer Relationship Management, and other business-to-  
17           business functions.<sup>48</sup>

18           AT&T has rolled out an aggressive VoIP initiative. Time Warner Cable has  
19           said that it is teaming with MCI and Sprint to offer VoIP services nationally. As  
20           such, this is not just a niche market, but one that all providers – ILECs, CLECs, cable  
21           providers, etc. – are rushing to participate in. As a U. S. News and World Report  
22           

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<sup>48</sup>See <http://www.qwest.com/about/qwest/network/index.html>.

1 article concluded, "The bottom line: Consumers and businesses stand to benefit from  
2 lower prices and a wide range of sophisticated features."<sup>49</sup>

3 **Q. WHY WOULD QWEST SEEK TO IMPOSE ACCESS CHARGES ON VOIP**  
4 **TRAFFIC WHEN IT IS DEPLOYING THE SERVICE?**

5 A. Qwest is attempting to maintain its sinecure access revenue as a prop as it migrates  
6 itself to the IP platforms – the end result being a continuation of its predominant  
7 market position and the lack of competition.

8 **Q. ASSUMING VOIP IS SUBSTITUTING FOR OTHER SERVICES, ARE**  
9 **THERE OFFSETS TO THE SUBSTITUTION OCCURRING IN THE**  
10 **INDUSTRY?**

11 A. Yes. Over the last few years, RBOCs have been the beneficiaries of gaining, for the  
12 first time, access to markets and associated revenues that have experienced  
13 tremendous growth. For example, Qwest announced last year that it had achieved  
14 one million DSL subscribers. This growth in DSL is directly related to the growing  
15 popularity of the Internet and related services, including VoIP. Specifically Qwest  
16 stated:

17 As a direct result of strategic DSL investments and initiatives, Qwest  
18 Communications International Inc. (NYSE: Q) announced today that it  
19 has achieved one million DSL subscribers. This represents an  
20 important milestone for the company and highlights the fact that  
21 Qwest's four consecutive quarters of double-digit subscriber growth is  
22 outpacing the current industry average.<sup>50</sup>

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<sup>49</sup> See, US News & World Report, "Courting Calls – Telecom and Cable Firms Scramble to Offer Internet Calls"; by Mary Kathleen Flynn; Feb 2, 2004.

<sup>50</sup> See Qwest Press Release entitled, "Qwest Achieves One Million DSL Subscriber Milestone", released December 13, 2004.

1 Qwest's consumer data and Internet revenues were up nearly 50 percent in 2004.  
2  
3 Qwest also ended 2004 with 4.6 million long-distance lines, more than double the 2.2  
4 million lines a year earlier. These significant gains, combined with reduction in the  
5 access line losses, shows that Qwest is not being harmed by the introduction of IP-  
6 Enabled services.

7 **Q. PLEASE EXPLAIN WHAT YOU MEAN BY "REDUCTION IN ACCESS**  
8 **LINE LOSSES."**

9 A. Prior to the passage of the 96 Act and the introduction of competition in the local  
10 market, ILECs had essentially 100 percent of the access lines. As CLECs entered to  
11 the local market, ILECs saw a reduction in the total number of access lines.  
12 Generally, the number of access lines lost increased over time. Since the demise of  
13 UNE-P, however, and the continuing consolidation in the CLEC market, the loss in  
14 access lines has decreased. In its fourth quarter 2004 financial reports, Qwest stated,

15 The company continues to make significant inroads in stemming  
16 competitive loss from facilities-based competitors. Resold lines  
17 declined 28,000 sequentially as changes in the regulatory environment  
18 have reduced competition from UNE resellers.<sup>51</sup>  
19

20 In that same document Qwest also noted under **Operational Highlights**, "Major  
21 drivers of Qwest's revenue included operational progress in key growth areas, as well  
22 as improvement in access line losses." So the "reduction in access line loss" is an  
23 indication that Qwest is taking back lines or losing fewer lines than in the past.

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<sup>51</sup> See Qwest News Release, "Qwest Improves in Key Growth Areas and Sees Margin Expansion in Fourth Quarter 2004."

1       **Q.   IS THERE ANY REASON WHY VOIP AND OTHER IP-ENABLED**  
2       **OFFERINGS SHOULD NOT BE GIVEN THE FREEDOM TO DEVELOP?**

3       A.   No. The Internet, VoIP applications, wireless, fixed wireless and other developing  
4       technologies only increase the value of local phone service. Today we are seeing  
5       significant investments in newer technologies (3G wireless, IP networks, IP CPE,  
6       PDAs, cable plant upgrades, automation and robotics, etc.) instead of continuing  
7       investment in the traditional circuit switched network.<sup>52</sup> These new investments and  
8       technologies are resulting in more efficient provisioning of service, new features and  
9       mobility, and flexibility in managing services and features. In fact, IP-Enabled  
10      services, with their integrated voice and data features, will make business and  
11      personal use of communications much more efficient. This new trend is adding value  
12      to the economy and consumers (residential and business alike) are enjoying new  
13      services and flexibility.

14      **Q.   WHY ARE VOIP, WIRELESS AND OTHER TECHNOLOGIES SO**  
15      **INTRIGUING TO CONSUMERS?**

16      A.   There are several reasons why consumers are attracted to these new offerings. These  
17      new services offer flexibility that a fixed wireline cannot offer and, as such, provide  
18      an important complement to wireline services. Wireless and VoIP services are  
19      portable so you can in effect take your service with you. In certain environments this  
20      is a significant benefit to consumers. Efficiency, which always entails a cost

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<sup>52</sup> I am not suggesting that investment in the traditional PSTN has stopped. Investments continue to be made, including maintenance on existing plant in service; the new investments, however, are focusing on new technologies.

1 advantage, is also a consumer issue. Further, companies will enjoy savings and  
2 efficiencies through virtual call centers, reduced commuting costs as employees work  
3 more efficiently from home and the obvious savings that competition will bring.

4 **Q. HAVE SOME STATES RECOGNIZED THE POTENTIAL EFFICIENCIES**  
5 **AND SAVINGS THAT VOIP MIGHT PROVIDE?**

6 A. Yes. A California Performance Review noted that "Moving to VoIP could reduce the  
7 state's phone bill by between \$20 million and \$75 million a year."<sup>53</sup> An article on the  
8 review also referred to findings that "VoIP technology has competitive features that  
9 would benefit the state. Internet-based phone calling has built-in benefits such as  
10 integrated caller ID, flexibility and network management tools that provide real-time  
11 monitoring of bandwidth."<sup>54</sup>

12 **Q. PLEASE SUMMARIZE YOUR TESTIMONY REGARDING THE**  
13 **REGULATION OF IP-ENABLED SERVICES.**

14 A. The Commission should adopt the same "hands off" policy that has been so  
15 successful in encouraging the development of Internet and other IP-based  
16 applications, including VoIP. Concurrently, the Commission should reaffirm its  
17 commitment to competitors, especially competitors that serve the VoIP application

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<sup>53</sup> "The ultimate goal of the California Performance Review is to restructure, reorganize and reform state government to make it more responsive to the needs of its citizens and business community. Only by demonstrating through concrete action the responsiveness of state government can the public's trust and confidence be regained." <http://cpr.ca.gov/about/#cpr>. The entire report can be found on the Internet at <http://www.report.cpr.ca.gov/>. The quotation in the text above is from the fourth volume of that report, at SO15, Voice Over Internet Protocol Statewide Network Infrastructure.

<sup>54</sup> See, "California Urged to Use Open Source, VoIP", c|net News.Com; August 13, 2004.

1 community, that non-discriminatory, cost based, pro-competitive access to the  
2 network infrastructure of the ILECs will be vigorously promoted and enforced.  
3 Unless there is some specific need to regulate such offerings, they should be allowed  
4 to thrive or fail based on the market dynamics they face and create.

5 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

6 **A.** Yes, it does.

## **EXHIBIT TJG-1**



**Qualifications of Timothy J Gates  
Exhibit TJG-1**

**Q. PLEASE DESCRIBE YOUR PROFESSIONAL EXPERIENCE.**

- A. Prior to my current position with QSI Consulting, I was a Senior Executive Staff Member in MCI WorldCom's ("MCIW") National Public Policy Group. In this position, I was responsible for providing public policy expertise in key cases across the country and for managing external consultants for MCIW's state public policy organization. In certain situations, I also provided testimony in regulatory and legislative proceedings.

Prior to my position with MCIW in Denver, I was an Executive Staff Member II at MCI Telecommunications ("MCI") World Headquarters in Washington D.C.. In that position I managed economists, external consultants, and provided training and policy support for regional regulatory staffs. Prior to that position I was a Senior Manager in MCI's Regulatory Analysis Department, which provided support in state regulatory and legislative matters to the various operating regions of MCI. In that position I was given responsibility for assigning resources from our group for state regulatory proceedings throughout the United States. At the same time, I prepared and presented testimony on various telecommunications issues before state regulatory and legislative bodies. I was also responsible for managing federal tariff reviews and presenting MCI's position on regulatory matters to the Federal Communications Commission. Prior to my assignment in the Regulatory Analysis Department, I was the Senior Manager of Economic Analysis and Regulatory Policy in the Legal, Regulatory and Legislative Affairs Department for the Midwest Division of MCI. In that position I developed and promoted regulatory policy within what was then a five-state operating division of MCI. I promoted MCI policy positions through negotiations, testimony and participation in industry forums.

Prior to my positions in the Midwest, I was employed as Manager of Tariffs and Economic Analysis with MCI's West Division in Denver, Colorado. In that position I was responsible for managing the development and application of MCI's tariffs in the fifteen MCI West states. I was also responsible for managing regulatory dockets and for providing economic and financial expertise in the areas of discovery and issue analysis. Prior to joining the West Division, I was a Financial Analyst III and then a Senior Staff Specialist with MCI's Southwest Division in Austin, Texas. In those positions, I was responsible for the management of regulatory dockets and liaison with outside counsel. I was also responsible for discovery, issue analysis, and for the development of working relationships with consumer and business groups. Just prior to joining MCI, I was employed by the Texas Public Utility Commission as a Telephone Rate Analyst in the Engineering Division responsible for examining



telecommunications cost studies and rate structures.

I was employed as an Economic Analyst with the Public Utility Commissioner of Oregon from July, 1983 to December, 1984. In that position, I examined and analyzed cost studies and rate structures in telecommunications rate cases and investigations. I also testified in rate cases and in private and public hearings regarding telecommunications services. Before joining the Oregon Commissioner's Staff, I was employed by the Bonneville Power Administration (United States Department of Energy) as a Financial Analyst, where I made total regional electric use forecasts and automated the Average System Cost Review Methodology. Prior to joining the Bonneville Power Administration, I held numerous positions of increasing responsibility in areas of forest management for both public and private forestry concerns.

**Q. PLEASE DESCRIBE YOUR EDUCATIONAL CREDENTIALS.**

A. I received a Bachelor of Science degree from Oregon State University and a Master of Management degree in Finance and Quantitative Methods from Willamette University's Atkinson Graduate School of Management. I have also attended numerous courses and seminars specific to the telecommunications industry, including the NARUC Annual and Advanced Regulatory Studies Program.

**Q. WHAT ARE YOUR CURRENT RESPONSIBILITIES?**

A. Effective April 1, 2000, I joined QSI Consulting as Senior Vice President and Partner. In this position I provide analysis and testimony for QSI's many clients. The deliverables include written and oral testimony, analysis of rates, cost studies and policy positions, position papers, presentations on industry issues and training.

**Q. PLEASE IDENTIFY THE JURISDICTIONS IN WHICH YOU HAVE TESTIFIED.**

A. I have filed testimony or comments on telecommunications issues in the following 44 states: Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Georgia, Florida, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Washington, West Virginia, Wisconsin and Wyoming. I have also filed comments with the FCC and made presentations to the Department of Justice.



I have testified or presented formal comments in the following proceedings and forums:

**Alabama:**

October 18, 2000; Docket No. 27867; Adelphia Business Solutions Arbitration with BellSouth Telecommunications; Direct Testimony on Behalf of Adelphia.

January 31, 2001; Docket No. 27867; Adelphia Business Solutions Arbitration with BellSouth Telecommunications; Rebuttal Testimony on Behalf of Adelphia.

**Arkansas:**

September 7, 2004; Docket No. 04-0999-U; In the Matter of Level 3 Petition for Arbitration with Southwestern Bell Telephone, L.P. D/B/A SBC Arkansas; Direct Testimony on Behalf of Level 3.

**Arizona:**

September 23, 1987; Arizona Corporation Commission Workshop on Special Access Services; Comments on Behalf of MCI.

August 21, 1996; Affidavit in Opposition to USWC Motion for Partial Summary Judgment; No. CV 95-14284, No. CV-96-03355, No. CV-96-03356, (consolidated); On Behalf of MCI.

October 24, 1997; Comments to the Universal Service Fund Working Group; Docket No. R-0000-97-137; On Behalf of MCI.

May 8, 1998; Comments to the Universal Service Fund Working Group; Docket No. R-0000-97-137; On Behalf of MCI.

November 9, 1998; Docket No. T-03175A-97-0251; Application of MCImetro Access Transmission Services, Inc. to Expand It's CCN to Provide IntraLATA Services and to Determine that Its IntraLATA Services are Competitive; Direct Testimony on Behalf of MCI WorldCom, Inc.

September 20, 1999; Docket No. T-00000B-97-238; USWC OSS Workshop; Comments on Behalf of MCI WorldCom, Inc.

January 8, 2001; Docket Nos. T-03654A-00-0882, T-01051B-00-0882; Petition of Level 3 Communications, LLC, for Arbitration with Qwest Corporation; Direct Testimony on Behalf of Level 3.



February 20, 2001; Superior Court of Arizona; Count of Maricopa; ESI Ergonomic Solutions, LLC, Plaintiff, vs. United Artists Theatre Circuit; No. CV 99-20649; Affidavit on Behalf of United Artists Theatre Circuit.

September 2, 2001; Docket No. T-00000A-00-0194 Phase II – A; Investigation into Qwest's Compliance with Wholesale Pricing Requirements for Unbundled Network Elements and Resale Discounts; Rebuttal Testimony on Behalf of WorldCom, Inc.

January 9, 2004; Docket No. T-00000A-03-0369; In the Matter of ILEC Unbundling Obligations as a Result of the Federal Triennial Review Order; Direct Testimony on Behalf of WorldCom, Inc. (MCI).

November 18, 2004; Docket No. T-01051B-0454; In the Matter of Qwest Corporation's Amended Renewed Price Regulation Plan; Direct Testimony on Behalf of Time Warner Telecom, Inc.

#### **Arkansas:**

September 7, 2004; Docket No. 04-099-U; In the Matter of Level 3 Petition for Arbitration Pursuant to Section 252(b) with Southwestern Bell Telephone, L.P. D/B/A SBC Arkansas; Direct Testimony on Behalf of Level 3 Communications, LLC.

#### **California:**

August 30, 1996; Application No. 96-08-068; MCI Petition for Arbitration with Pacific Bell; Direct Testimony on Behalf of MCI.

September 10, 1996; Application No. 96-09-012; MCI Petition for Arbitration with GTE California, Inc.; Direct Testimony on Behalf of MCI.

June 5, 2000; Docket No. A0004037; Petition of Level 3 Communications for Arbitration of an Interconnection Agreement with Pacific Bell Telephone Company; Direct Testimony on Behalf of Level 3 Communications, LLC.

June 1, 2004; Docket No. A.04-06-004; Petition of Level 3 Communications for Arbitration with SBC; Direct Testimony on Behalf of Level 3 Communications LLC.



December 1, 1986; Investigation and Suspension Docket No. 1720; Rate Case of Mountain States Telephone and Telegraph Company; Direct Testimony on Behalf of MCI.

October 26, 1988; Investigation and Suspension Docket No. 1766; Mountain States Telephone and Telegraph Company's Local Calling Access Plan; Direct Testimony on Behalf of MCI.

September 6, 1996; MCImetro Petition for Arbitration with U S WEST Communications, Inc.; Docket No. 96A-366T (consolidated); Direct Testimony on Behalf of MCI.

September 17, 1996; MCImetro Petition for Arbitration with U S WEST Communications, Inc.; Docket No. 96A-366T (consolidated); Rebuttal Testimony on Behalf of MCI.

September 26, 1996; Application of U S WEST Communications, Inc. To Modify Its Rate and Service Regulation Plan; Docket No. Docket No. 90A-665T (consolidated); Direct Testimony on Behalf of MCI.

October 7, 1996; Application of U S WEST Communications, Inc. To Modify Its Rate and Service Regulation Plan; Docket No. Docket No. 90A-665T (consolidated); Rebuttal Testimony on Behalf of MCI.

July 18, 1997; Complaint of MCI to Reduce USWC Access Charges to Economic Cost; Docket Nos. 97K-237T, 97F-175T (consolidated) and 97F-212T (consolidated); Direct Testimony on Behalf of MCI.

August 15, 1997; Complaint of MCI to Reduce USWC Access Charges to Economic Cost; Docket Nos. 97K-237T, 97F-175T (consolidated) and 97F-212T (consolidated); Rebuttal Testimony on Behalf of MCI.

March 10, 1998; Application of WorldCom, Inc. for Approval to Transfer Control of MCI to WorldCom, Inc.; Docket No. 97A-494T; Supplemental Direct Testimony on Behalf of MCI.

March 26, 1998; Application of WorldCom, Inc. for Approval to Transfer Control of MCI to WorldCom, Inc.; Docket No. 97A-494T; Rebuttal Testimony on Behalf of MCI.

May 8, 1998; Application of WorldCom, Inc. for Approval to Transfer Control of MCI to WorldCom, Inc.; Docket No. 97A-494T; Affidavit in Response to GTE.



November 4, 1998; Proposed Amendments to the Rules Prescribing IntraLATA Equal Access; Docket No. 98R-426T; Comments to the Commission on Behalf of MCI WorldCom and AT&T Communications of the Mountain States, Inc.

May 13, 1999; Proposed Amendments to the Rules on Local Calling Area Standards; Docket No. 99R-128T; Oral Comments before the Commissioners on Behalf of MCIW.

January 4, 2001; Petition of Level 3 Communications, LLC for Arbitration with Qwest Corporation; Docket No. 00B-601T; Direct Testimony on Behalf of Level 3.

January 16, 2001; Petition of Level 3 Communications, LLC for Arbitration with Qwest Corporation; Docket No. 00B-601T; Rebuttal Testimony on Behalf of Level 3.

January 29, 2001; Qwest Corporation, Inc., Plaintiff, v. IP Telephony, Inc., Defendant. District Court, City and County of Denver, State of Colorado; Case No. 99CV8252; Direct Testimony on Behalf of IP Telephony.

June 27, 2001; US WEST Statement of Generally Available Terms and Conditions; Docket No. 99I-577T; Direct Testimony on Behalf of Covad Communications Company, Rhythms Links, Inc., and New Edge Networks, Inc.

January 26, 2004; Regarding the Unbundling Obligations of ILECs Pursuant to the Triennial Review Order; Docket No. 03I-478T; Direct Testimony on Behalf of WorldCom, Inc. (MCI).

February 18, 2005; Regarding Application of Qwest for Reclassification and Deregulation of Certain Products and Services; Docket No. 04A-411T; Direct Testimony on Behalf of Time Warner Telecom.

#### **Connecticut:**

November 2, 2004; Petition of Level 3 Communications, LLC for Arbitration Pursuant to Section 252(b) with Southern New England Telephone Company d/b/a/ SBC Connecticut; Level 3/SNET Arbitration; Direct Testimony on Behalf of Level 3 Communications, LLC.

#### **Delaware:**

February 12, 1993; Diamond State Telephone Company's Application for a Rate Increase; Docket No. 92-47; Direct Testimony on Behalf of MCI.



July 1, 1994; Investigation into IntraLATA Presubscription; Docket No. 930330-TP; Direct Testimony on Behalf of MCI.

October 5, 2000; Petition of Level 3 for Arbitration with BellSouth; Docket No. 000907-TP; Direct Testimony On Behalf of Level 3.

October 13, 2000; Petition of BellSouth for Arbitration with US LEC of Florida Inc.; Docket No. 000084-TP; Direct Testimony On Behalf of US LEC.

October 27, 2000; Petition of BellSouth for Arbitration with US LEC of Florida Inc.; Docket No. 000084-TP; Rebuttal Testimony On Behalf of US LEC.

November 1, 2000; Petition of Level 3 for Arbitration with BellSouth; Docket No. 000907-TP; Rebuttal Testimony On Behalf of Level 3.

June 11, 2004; Petition of KMC Telecom for Arbitration with Sprint Communications; Docket No. 031047-TP; Direct Testimony on Behalf of KMC Telecom III, L.L.C, KMC Telecom V, Inc., and KMC Data, L.L.C.

July 9, 2004; Petition of KMC Telecom for Arbitration with Sprint Communications; Docket No. 031047-TP; Rebuttal Testimony on Behalf of KMC Telecom III, L.L.C, KMC Telecom V, Inc., and KMC Data, L.L.C.

### **Georgia:**

December 6, 2000; Docket No. 12645-U; Petition of Level 3 for Arbitration with BellSouth; Direct Testimony on Behalf of Level 3.

December 20, 2000; Docket No. 12645-U; Petition of Level 3 for Arbitration with BellSouth; Rebuttal Testimony on Behalf of Level 3.

### **Idaho:**

November 20, 1987; Case No. U\_1150\_1; Petition of MCI for a Certificate of Public Convenience and Necessity; Direct Testimony on Behalf of MCI.

March 17, 1988; Case No. U\_1500\_177; Investigation of the Universal Local Access Service Tariff; Direct Testimony on Behalf of MCI.

April 26, 1988; Case No. U\_1500\_177; Investigation of the Universal Local Access Service Tariff; Rebuttal Testimony on Behalf of MCI.





November 25, 2002; Case No. GNR-T-02-16; Petition of Potlatch, CenturyTel, the Idaho Telephone Association for Declaratory Order Prohibiting the Use of "Virtual" NXX Calling; Comments/Presentation on Behalf of Level 3, AT&T, WorldCom, and Time Warner Telecom.

#### **Illinois:**

January 16, 1989; Docket No. 83-0142; Appropriate Methodology for Intrastate Access Charges; Rebuttal Testimony Regarding Toll Access Denial on Behalf of MCI.

February 16, 1989; Docket No. 83-0142; Appropriate Methodology for Intrastate Access Charges; Testimony Regarding ICTC's Access Charge Proposal on Behalf of MCI.

May 3, 1989; Docket No. 89-0033; Illinois Bell Telephone Company's Rate Restructuring; Direct Testimony on Behalf of MCI.

July 14, 1989; Docket No. 89-0033; Illinois Bell Telephone Company's Rate Restructuring; Rebuttal Testimony on Behalf of MCI.

November 22, 1989; Docket No. 88-0091; IntraMSA Dialing Arrangements; Direct Testimony on Behalf of MCI.

February 9, 1990; Docket No. 88-0091; IntraMSA Dialing Arrangements; Rebuttal Testimony on Behalf of MCI.

November 19, 1990; Docket No. 83-0142; Industry presentation to the Commission re Docket No. 83-0142 and issues for next generic access docket; Comments re the Imputation Trial and Unitary Pricing/Building Blocks on Behalf of MCI.

July 29, 1991; Case No. 90-0425; Presentation to the Industry Regarding MCI's Position on Imputation.

November 18, 1993; Docket No. 93-0044; Complaint of MCI and LDDS re Illinois Bell Additional Aggregated Discount and Growth Incentive Discount Services; Direct Testimony on Behalf of MCI and LDDS.

January 10, 1994; Docket No. 93-0044; Complaint of MCI and LDDS re Illinois Bell Additional Aggregated Discount and Growth Incentive Discount Services; Rebuttal Testimony on Behalf of MCI and LDDS.



May 30, 2000; Docket No. 00-0332; Level 3 Petition for Arbitration to Establish and Interconnection Agreement with Illinois Bell Telephone Company; Direct Testimony on Behalf of Level (3) Communications, LLC.

July 11, 2000; Docket No. 00-0332; Level 3 Petition for Arbitration to Establish and Interconnection Agreement with Illinois Bell Telephone Company; Supplemental Verified Statement on Behalf of Level (3) Communications, LLC.

June 22, 2004; Docket No. 04-0428; Level 3 Petition for Arbitration to Establish an Interconnection Agreement with Illinois Bell Telephone Company; Direct Testimony on Behalf of Level (3) Communications, LLC.

September 3, 2004; Docket No. 04-0428; Level 3 Petition for Arbitration to Establish an Interconnection Agreement with Illinois Bell Telephone Company; Direct Testimony on Behalf of Level (3) Communications, LLC.

#### **Indiana:**

October 28, 1988; Cause No. 38561; Deregulation of Customer Specific Offerings of Indiana Telephone Companies; Direct Testimony on Behalf of MCI.

December 16, 1988; Cause No. 38561; Deregulation of Customer Specific Offerings of Indiana Telephone Companies; Direct Testimony on Behalf of MCI Regarding GTE.

April 14, 1989; Cause No. 38561; Deregulation of Customer Specific Offerings of Indiana Telephone Companies; Direct Testimony on Behalf of MCI Regarding Staff Reports.

June 21, 1989; Cause No. 37905; Intrastate Access Tariffs -- Parity with Federal Rates; Direct Testimony on Behalf of MCI.

June 29, 1989; Cause No. 38560; Reseller Complaint Regarding 1+ IntraLATA Calling; Direct Testimony on Behalf of MCI.

October 25, 1990; Cause No. 39032; MCI Request for IntraLATA Authority; Direct Testimony on Behalf of MCI.

April 4, 1991; Rebuttal Testimony in Cause No. 39032 re MCI's Request for IntraLATA Authority on Behalf of MCI.

September 2, 2004; Cause No. 42663-INT-01; In the Matter of Level 3 Communications, LLC Petition for Arbitration with SBC Indiana; Direct Testimony on Behalf of Level 3 Communications, LLC.



October 5, 2004; Cause No. 42663-INT-01; In the Matter of Level 3 Communications, LLC Petition for Arbitration with SBC Indiana; Rebuttal Testimony on Behalf of Level 3 Communications, LLC.

**Iowa:**

September 1, 1988; Docket No. RPU 88\_6; IntraLATA Competition in Iowa; Direct Testimony on Behalf of MCI.

September 20, 1988; Docket No. RPU\_88\_1; Regarding the Access Charges of Northwestern Bell Telephone Company; Direct Testimony on Behalf of MCI.

September 25, 1991; Docket No. RPU-91-4; Investigation of the Earnings of U S WEST Communications, Inc.; Direct Testimony on Behalf of MCI.

October 3, 1991; Docket No. NOI-90-1; Presentation on Imputation of Access Charges and the Other Costs of Providing Toll Services; On Behalf of MCI.

November 5, 1991; Docket No. RPU-91-4; Investigation of the Earnings of U S WEST Communications, Inc.; Rebuttal Testimony on Behalf of MCI.

December 23, 1991; Docket No. RPU-91-4; Investigation of the Earnings of US WEST Communications; Inc.; Supplemental Testimony on Behalf of MCI.

January 10, 1992; Docket No. RPU-91-4; Investigation of the Earnings of U S WEST Communications, Inc.; Rebuttal Testimony on Behalf of MCI.

January 20, 1992; Docket No. RPU-91-4; Investigation of the Earnings of U S WEST Communications, Inc.; Surrebuttal Testimony on Behalf of MCI.

June 8, 1999; Docket NOI-99-1; Universal Service Workshop; Participated on numerous panels during two day workshop; Comments on Behalf of MCIW.

October 27, 1999; Docket NOI-99-1; Universal Service Workshop; Responded to questions posed by the Staff of the Board during one day workshop; Comments on Behalf of MCIW and AT&T.

November 14, 2003; Docket Nos. INU-03-4, WRU-03-61; In Re: Qwest Corporation; Sworn Statement of Position on Behalf of MCI.

December 15, 2003; Docket Nos. INU-03-4, WRU-03-61; In Re: Qwest Corporation; Sworn Counter Statement of Position on Behalf of MCI.

**Kansas:**

June 10, 1992; Docket No. 181,097-U; General Investigation into IntraLATA Competition within the State of Kansas; Direct Testimony on Behalf of MCI.

September 16, 1992; Docket No. 181,097-U; General Investigation into IntraLATA Competition within the State of Kansas; Rebuttal Testimony on Behalf of MCI.

August 31, 2004; Docket No. 04-L3CT-1046-ARB; In the Matter of Arbitration Between Level 3 Communications LLC and SBC Communications; Direct Testimony on Behalf of Level 3 Communications, LLC.

**Kentucky:**

May 20, 1993; Administrative Case No. 323, Phase I; An Inquiry into IntraLATA Toll Competition, an Appropriate Compensation Scheme for Completion of IntraLATA Calls by Interexchange Carriers, and WATS Jurisdictionality; Direct Testimony on Behalf of MCI.

December 21, 2000; Case No. 2000-404; Petition of Level 3 Communications, LLC for Arbitration with BellSouth; Direct Testimony on Behalf of Level 3.

January 12, 2001; Case No. 2000-477; Petition of Adelphia Business Solutions for Arbitration with BellSouth; Direct Testimony on Behalf of Adelphia.

**Louisiana:**

December 28, 2000; Docket No. U-25301; Petition of Adelphia Business Solutions for Arbitration with BellSouth; Direct Testimony on Behalf of Adelphia.

January 5, 2001; Docket No. U-25301; Petition of Adelphia Business Solutions for Arbitration with BellSouth; Rebuttal Testimony on Behalf of Adelphia.

**Maryland:**

November 12, 1993; Case No. 8585; Competitive Safeguards Required re C&P's Centrex Extend Service; Direct Testimony on Behalf of MCI.

January 14, 1994; Case No. 8585; Competitive Safeguards Required re C&P's Centrex Extend Service; Rebuttal Testimony on Behalf of MCI.



May 19, 1994; Case No. 8585; Re Bell Atlantic Maryland, Inc.'s Transmittal No. 878; Testimony on Behalf of MCI.

June 2, 1994; Case No. 8585; Competitive Safeguards Required re C&P's Centrex Extend Service; Rebuttal Testimony on Behalf of MCI.

September 5, 2001; Case No. 8879; Rates for Unbundled Network Elements Pursuant to the Telecommunications Act of 1996; Rebuttal Testimony on behalf of the Staff of the Public Service Commission of Maryland.

October 15, 2001; Case No. 8879; Rates for Unbundled Network Elements Pursuant to the Telecommunications Act of 1996; Surrebuttal Testimony on behalf of the Staff of the Public Service Commission of Maryland.

#### **Massachusetts:**

April 22, 1993; D.P.U. 93-45; New England Telephone Implementation of Interchangeable NPAs; Direct Testimony on Behalf of MCI.

May 10, 1993; D.P.U. 93-45; New England Telephone Implementation of Interchangeable NPAs; Rebuttal Testimony on Behalf of MCI.

#### **Michigan:**

September 29, 1988; Case Nos. U\_9004, U\_9006, U\_9007 (Consolidated); Industry Framework for IntraLATA Toll Competition; Direct Testimony on Behalf of MCI.

November 30, 1988; Case Nos. U\_9004, U\_9006, U\_9007 (Consolidated); Industry Framework for IntraLATA Toll Competition; Rebuttal Testimony on Behalf of MCI.

June 30, 1989; Case No. U-8987; Michigan Bell Telephone Company Incentive Regulation Plan; Direct Testimony on Behalf of MCI.

July 31, 1992; Case No. U-10138; MCI v Michigan Bell and GTE re IntraLATA Equal Access; Direct Testimony on Behalf of MCI.

November 17, 1992; Case No. U-10138; MCI v Michigan Bell and GTE re IntraLATA Equal Access; Rebuttal Testimony on Behalf of MCI.

July 22, 1993; Case No. U-10138 (Reopener); MCI v Michigan Bell and GTE re IntraLATA Equal Access; Direct Testimony on Behalf of MCI.



February 16, 2000; Case No. U-12321; AT&T Communications of Michigan, Inc. Complainant v. GTE North Inc. and Contel of the South, Inc., d/b/a GTE Systems of Michigan; Direct Testimony on Behalf of AT&T. (Adopted Testimony of Michael Starkey)

May 11, 2000; Case No. U-12321; AT&T Communications of Michigan, Inc. Complainant v. GTE North Inc. and Contel of the South, Inc., d/b/a GTE Systems of Michigan; Rebuttal Testimony on Behalf of AT&T.

June 8, 2000; Case No. U-12460; Petition of Level 3 Communications for Arbitration to Establish an Interconnection Agreement with Ameritech Michigan; Direct Testimony on Behalf of Level (3) Communications, LLC.

September 27, 2000; Case No. U-12528; In the Matter of the Implementation of the Local Calling Area Provisions of the MTA; Rebuttal Testimony on Behalf of Focal Communications, Inc.

June 1, 2004; Case No. U-14152; Petition of Level 3 Communications LLC for Arbitration with SBC Michigan; Direct Testimony on Behalf of Level 3 Communications, LLC.

#### **Minnesota:**

January 30, 1987; Docket No. P\_421/CI\_86\_88; Summary Investigation into Alternative Methods for Recovery of Non-traffic Sensitive Costs; Comments to the Commission on Behalf of MCI.

September 7, 1993; Docket No. P-999/CI-85-582, P-999/CI-87-697 and P-999/CI-87-695, In the Matter of an Investigation into IntraLATA Equal Access and Presubscription; Comments of MCI on the Report of the Equal Access and Presubscription Study Committee on Behalf of MCI.

September 20, 1996; Petition for Arbitration with U S WEST Communications, Inc.; Docket No. P-442, 421/M-96-855; P-5321, 421/M-96-909; and P-3167, 421/M-96-729 (consolidated); Direct Testimony on Behalf of MCI.

September 30, 1996; Petition for Arbitration with U S WEST Communications, Inc.; Docket No. P-442, 421/M-96-855; P-5321, 421/M-96-909; and P-3167, 421/M-96-729 (consolidated); Rebuttal Testimony on Behalf of MCI.

September 14-16, 1999; USWC OSS Workshop; Comments on Behalf of MCI WorldCom, Inc. re OSS Issues.



September 28, 1999; Docket No. P-999/R-97-609; Universal Service Group; Comments on Behalf of MCI WorldCom, Inc. and AT&T Communications.

April 18, 2002; Commission Investigation of Qwest's Pricing of Certain Unbundled Network Elements; Docket Nos. P-442, 421, 3012/M-01-1916; P-421/C1-01-1375; OAH Docket No. 12-2500-14490; Rebuttal Testimony on Behalf of McLeod USA Telecommunications Services, Inc., Eschelon Telecom of Minnesota, Inc., US Link, Inc., Northstar Access, LLC, Otter Tail Telecomm LLC, VAL-Ed Joint Venture, LLP, dba 702 Communications.

January 23, 2004; In the Matter of the Commission Investigation into ILEC Unbundling Obligations as a Result of the Federal Triennial Review Order; Docket No.: P-999/CI-03-961; Direct Testimony on Behalf of WorldCom, Inc. (MCI).

#### **Mississippi:**

February 2, 2001; Docket No. 2000-AD-846; Petition of Adelphia Business Solutions for Arbitration with BellSouth Telecommunications; Direct Testimony on Behalf of Adelphia.

February 16, 2001; Docket No. 2000-AD-846; Petition of Adelphia Business Solutions for Arbitration with BellSouth Telecommunications; Rebuttal Testimony on Behalf of Adelphia.

#### **Montana:**

May 1, 1987; Docket No. 86.12.67; Rate Case of AT&T Communications of the Mountain States, Inc.; Direct Testimony on Behalf of MCI.

September 12, 1988; Docket No. 88.1.2; Rate Case of Mountain States Telephone and Telegraph Company; Direct Testimony on Behalf of MCI.

May 12, 1998; Docket No. D97.10.191; Application of WorldCom, Inc. for Approval to Transfer Control of MCI Communications Corporation to WorldCom, Inc.; Rebuttal Testimony on Behalf of MCI.

June 1, 1998; Docket No. D97.10.191; Application of WorldCom, Inc. for Approval to Transfer Control of MCI Communications Corporation to WorldCom, Inc.; Amended Rebuttal Testimony on Behalf of MCI.



### **Nebraska:**

November 6, 1986; Application No. C\_627; Nebraska Telephone Association Access Charge Proceeding; Direct Testimony on Behalf of MCI.

March 31, 1988; Application No. C\_749; Application of United Telephone Long Distance Company of the Midwest for a Certificate of Public Convenience and Necessity; Direct Testimony on Behalf of MCI.

### **New Hampshire:**

April 30, 1993; Docket DE 93-003; Investigation into New England Telephone's Proposal to Implement Seven Digit Dialing for Intrastate Toll Calls; Direct Testimony on Behalf of MCI.

January 12, 2001; Docket No. DT 00-223; Investigation Into Whether Certain Calls are Local; Direct Testimony on Behalf of BayRing Communications.

April 5, 2002; Docket No. DT 00-223; Investigation Into Whether Certain Calls are Local; Rebuttal Testimony on Behalf of BayRing Communications.

### **New Jersey:**

September 15, 1993; Docket No. TX93060259; Notice of Pre-Proposal re IntraLATA Competition; Comments in Response to the Board of Regulatory Commissioners on Behalf of MCI.

October 1, 1993; Docket No. TX93060259; Notice of Pre-Proposal re IntraLATA Competition; Reply Comments in Response to the Board of Regulatory Commissioners on Behalf of MCI.

April 7, 1994; Docket Nos. TX90050349, TE92111047, and TE93060211; Petitions of MCI, Sprint and AT&T for Authorization of IntraLATA Competition and Elimination of Compensation; Direct Testimony on Behalf of MCI.

April 25, 1994; Docket Nos. TX90050349, TE92111047, and TE93060211; Petitions of MCI, Sprint and AT&T for Authorization of IntraLATA Competition and Elimination of Compensation; Rebuttal Testimony on Behalf of MCI.

### **New Mexico:**

September 28, 1987; Docket No. 87\_61\_TC; Application of MCI for a Certificate of Public Convenience and Necessity; Direct Testimony on Behalf of MCI.



August 30, 1996: Docket No. 95-572-TC; Petition of AT&T for IntraLATA Equal Access; Rebuttal Testimony on Behalf of MCI.

September 16, 2002; Utility Case No. 3495, Phase B; Consideration of Costing and Pricing Rules for OSS, Collocation, Shared Transport, Nonrecurring Charges, Spot Frames, Combination of Network Elements and Switching; Direct Testimony on Behalf of the Staff of the New Mexico Public Regulation Commission.

February 9, 2004; Case Nos. 03-00403-UT and 03-00404-UT; Triennial Review Proceedings (Batch Hot Cut and Local Circuit Switching); Testimony on Behalf of WorldCom, Inc. (MCI).

May 11, 2004; Case No. 00108-UT; Regarding Unfiled Agreements between Qwest Corporation and Competitive Local Exchange Carriers; Testimony on Behalf of Time Warner Telecom

**New York:**

April 30, 1992; Case 28425; Comments of MCI Telecommunications Corporation on IntraLATA Presubscription.

June 8, 1992; Case 28425; Reply Comments of MCI Telecommunications Corporation on IntraLATA Presubscription.

**North Carolina:**

August 4, 2000; Docket No. P779 SUB4; Petition of Level (3) Communications, LLC for Arbitration with Bell South; Direct Testimony on Behalf of Level (3) Communications, LLC.

September 18, 2000; Docket No. P779 SUB4; Petition of Level (3) Communications, LLC for Arbitration with Bell South; Rebuttal Testimony on Behalf of Level (3) Communications, LLC.

October 18, 2000; Docket No. P-886, SUB 1; Petition of Adelphia Business Solutions of North Carolina, LP for Arbitration with BellSouth; Direct Testimony on Behalf of Adelphia.

December 8, 2000; Docket No. P-886, SUB 1; Petition of Adelphia Business Solutions of North Carolina, LP for Arbitration with BellSouth; Rebuttal Testimony on Behalf of Adelphia.



#### **North Dakota:**

June 24, 1991; Case No. PU-2320-90-183 (Implementation of SB 2320 -- Subsidy Investigation); Direct Testimony on Behalf of MCI.

October 24, 1991; Case No. PU-2320-90-183 (Implementation of SB 2320 -- Subsidy Investigation); Rebuttal Testimony on Behalf of MCI.

December 4, 2002; Case No. PU-2065-02-465; Petition of Level 3 for Arbitration with SRT Communications Cooperative; Direct Testimony on Behalf of Level (3) Communications, LLC.

May 2, 2003; Case No. PU-2342-01-296; Qwest Corporation Price Investigation; Direct Testimony on Behalf of the CLEC Coalition (US Link, Inc., VAL-ED Joint Venture LLP d/b/a 702 Communications, McLeodUSA Telecommunications, Inc. and IdeaOne Telecom Group, LLC).

#### **Ohio:**

February 26, 2004; Case No. 04-35-TP-COI; In the Matter of the Implementation of the FCC's Triennial Review Regarding Local Circuit Switching in the Cincinnati Bell Telephone Company's Mass Market; Direct Testimony on Behalf of AT&T.

#### **Oklahoma:**

April 2, 1992; Cause No. 28713; Application of MCI for Additional CCN Authority to Provide IntraLATA Services; Direct Testimony on Behalf of MCI.

June 22, 1992; Cause No. 28713; Application of MCI for Additional CCN Authority to Provide IntraLATA Services; Rebuttal Testimony on Behalf of MCI.

#### **Oregon:**

October 27, 1983; Docket No. UT 9; Pacific Northwest Bell Telephone Company Business Measured Service; Direct Testimony on Behalf of the Public Utility Commissioner of Oregon.

April 23, 1984; Docket No. UT 17; Pacific Northwest Bell Telephone Company Business Measured Service; Direct Testimony on Behalf of the Public Utility Commissioner of Oregon.

May 7, 1984; Docket No. UT 17; Pacific Northwest Bell Telephone Company Business Measured Service; Rebuttal Testimony on Behalf of the Public Utility Commissioner of Oregon.



October 31, 1986; Docket No. AR 154; Administrative Rules Relating to the Universal Service Protection Plan; Rebuttal Testimony on Behalf of MCI.

September 6, 1996; Docket ARB3/ARB6; Petition of MCI for Arbitration with U S WEST Communications, Inc.; Direct Testimony on Behalf of MCI.

October 11, 1996; Docket No. ARB 9; Interconnection Contract Negotiations Between MCImetro and GTE; Direct Testimony on Behalf of MCI.

November 5, 1996; Docket No. ARB 9; Interconnection Contract Negotiations Between MCImetro and GTE; Rebuttal Testimony on Behalf of MCI.

November 6, 2002; Docket No. UM 1058; Investigation into the Use of Virtual NPA/NXX Calling Patterns; Comments/Presentation on Behalf of Level (3) Communications, LLC.

#### **Pennsylvania:**

December 9, 1994; Docket No. I-00940034; Investigation Into IntraLATA Interconnection Arrangements (Presubscription); Direct Testimony on Behalf of MCI.

September 5, 2002; Docket No. C-20028114; Level 3 Communications, LLC v. Marianna & Scenery Hill Telephone Company; Direct Testimony on Behalf of Level (3) Communications, LLC.

#### **Rhode Island:**

April 30, 1993; Docket No. 2089; Dialing Pattern Proposal Made by the New England Telephone Company; Direct Testimony on Behalf of MCI.

#### **South Carolina:**

October 2000; Docket No. 2000-0446-C; US LEC of South Carolina Inc. Arbitration with BellSouth Telecommunications; Direct Testimony on Behalf of US LEC.

November 22, 2000; Docket No. 2000-516-C; Adelphia Business Solutions of South Carolina, Inc. Arbitration with BellSouth Telecommunications; Direct Testimony on Behalf of Adelphia.



December 14, 2000; Docket No. 2000-516-C; Adelphia Business Solutions of South Carolina, Inc. Arbitration with BellSouth Telecommunications; Rebuttal Testimony on Behalf of Adelphia.

**South Dakota:**

November 11, 1987; Docket No. F\_3652\_12; Application of Northwestern Bell Telephone Company to Introduce Its Contract Toll Plan; Direct Testimony on Behalf of MCI.

May 27, 2003; Docket No. TC03-057; Application of Qwest to Reclassify Local Exchange Services as Fully Competitive; Direct Testimony on Behalf of WorldCom, Inc., Black Hills FiberCom and Midcontinent Communications.

**Tennessee:**

January 31, 2001; Petition of Adelphia Business Solutions for Arbitration with BellSouth Telecommunications; Direct Testimony on Behalf of Adelphia.

February 7, 2001; Petition of Adelphia Business Solutions for Arbitration with BellSouth Telecommunications; Rebuttal Testimony on Behalf of Adelphia.

**Texas:**

June 5, 2000; PUC Docket No. 22441; Petition of Level 3 for Arbitration with Southwestern Bell Telephone Company; Direct Testimony on Behalf of Level (3) Communications, LLC.

June 12, 2000; PUC Docket No. 22441; Petition of Level 3 for Arbitration with Southwestern Bell Telephone Company; Rebuttal Testimony on Behalf of Level (3) Communications, LLC.

October 10, 2002; PUC Docket No. 26431; Petition of Level 3 for Arbitration with CenturyTel of Lake Dallas, Inc. and CenturyTel of San Marcos, Inc.; Direct Testimony on Behalf of Level (3) Communications, LLC.

October 16, 2002; PUC Docket No. 26431; Petition of Level 3 for Arbitration with CenturyTel of Lake Dallas, Inc. and CenturyTel of San Marcos, Inc.; Reply Testimony on Behalf of Level (3) Communications, LLC.

July 19, 2004; PUC Docket No. 28821; Arbitration of Non-costing Issues for Successor Interconnection Agreement to the Texas 271 Agreement; Direct Testimony on Behalf of KMC Telecom III, L.L.C, KMC Telecom V, Inc. (d/b/a KMC Network Services, Inc.), and KMC Data, L.L.C.



August 23, 2004; PUC Docket No. 28821; Arbitration of Non-costing Issues for Successor Interconnection Agreement to the Texas 271 Agreement; Rebuttal Testimony on Behalf of KMC Telecom III, L.L.C, KMC Telecom V, Inc. (d/b/a KMC Network Services, Inc.), and KMC Data, L.L.C.

**Utah:**

November 16, 1987; Case No. 87\_049\_05; Petition of the Mountain State Telephone and Telegraph Company for Exemption from Regulation of Various Transport Services; Direct Testimony on Behalf of MCI.

July 7, 1988; Case No. 83\_999\_11; Investigation of Access Charges for Intrastate InterLATA and IntraLATA Telephone Services; Direct Testimony on Behalf of MCI.

November 8, 1996; Docket No. 96-095-01; MCImetro Petition for Arbitration with USWC Pursuant to 47 U.S.C. Section 252; Direct Testimony on Behalf of MCI.

November 22, 1996; Docket No. 96-095-01; MCImetro Petition for Arbitration with USWC Pursuant to 47 U.S.C. Section 252; Rebuttal Testimony on Behalf of MCI.

September 3, 1997; Docket No. 97-049-08; USWC Rate Case; Surrebuttal Testimony on Behalf of MCI.

September 29, 1997; Docket No. 97-049-08; USWC Rate Case; Revised Direct Testimony on Behalf of MCI.

February 2, 2001; Docket No. 00-999-05; In the Matter of the Investigation of Inter-Carrier Compensation for Exchanged ESP Traffic; Direct Testimony on Behalf of Level 3 Communications, LLP.

January 13, 2004; Docket No. 03-999-04; In the Matter of a Proceeding to Address Actions Necessary to Respond to the FCC's Triennial Review Order; Direct Testimony on Behalf of WorldCom, Inc. (MCI).

**Washington:**

September 27, 1988; Docket No. U-88-2052-P; Petition of Pacific Northwest Bell Telephone Company for Classification of Services as Competitive; Direct Testimony on Behalf of MCI.



October 11, 1996; Docket No. UT-96-0338; Petition of MCImetro for Arbitration with GTE Northwest, Inc., Pursuant to 47 U.S.C.252; Direct Testimony on Behalf of MCI.

November 20, 1996; Docket No. UT-96-0338; Petition of MCImetro for Arbitration with GTE Northwest, Inc., Pursuant to 47 U.S.C.252; Rebuttal Testimony on Behalf of MCI.

January 13, 1998; Docket No. UT-97-0325; Rulemaking Workshop re Access Charge Reform and the Cost of Universal Service; Comments and Presentation on Behalf of MCI.

December 21, 2001; Docket No. UT-003013, Part D; Continued Costing and Pricing of Unbundled Network Elements, Transport, and Termination; Direct Testimony on Behalf of WorldCom, Inc.

October 18, 2002; Docket No. UT-023043; Petition of Level 3 for Arbitration with CenturyTel of Washington, Inc.; Direct Testimony on Behalf of Level (3) Communications, LLC.

November 1, 2002; Docket No. UT-023043; Petition of Level 3 for Arbitration with CenturyTel of Washington, Inc.; Rebuttal Testimony on Behalf of Level (3) Communications, LLC.

January 31, 2003; Docket No. UT-021569; Developing an Interpretive or Policy Statement relating to the Use of Virtual NPA/NXX Calling Patterns; Comments on Behalf of WorldCom, Inc. and KMC Telecom.

May 1, 2003; Docket No. UT-021569; Developing an Interpretive or Policy Statement relating to the Use of Virtual NPA/NXX Calling Patterns; Workshop Participation on Behalf of MCI, KMC Telecom, and Level (3) Communications, LLC.

August 13, 2003; Docket No. UT-030614; In the Matter of the Petition of Qwest Corporation for Competitive Classification of Basic Exchange Telecommunications Services; Direct Testimony on Behalf of MCI, Inc.

August 29, 2003; UT-030614; In the Matter of the Petition of Qwest Corporation for Competitive Classification of Basic Exchange Telecommunications Services; Rebuttal Testimony on Behalf of MCI, Inc.



September 13, 2004; Docket No. UT-033011; In the Matter of Washington Utilities and Transportation Commission, Petitioners, v. Advanced Telecom Group, Inc., et al, Respondents; Direct Testimony on Behalf of Time Warner Telecom of Washington, LLC.

**West Virginia:**

October 11, 1994; Case No. 94-0725-T-PC; Bell Atlantic - West Virginia Incentive Regulation Plan; Direct Testimony on Behalf of MCI.

June 18, 1998; Case No. 97-1338-T-PC; Petition of WorldCom, Inc. for Approval to Transfer Control of MCI Communications Corporation to WorldCom, Inc.; Rebuttal Testimony on Behalf of MCI.

**Wisconsin:**

October 31, 1988; Docket No. 05\_TR\_102; Investigation of Intrastate Access Costs, Settlements, and IntraLATA Access Charges; Direct Testimony on Behalf of MCI.

November 14, 1988; Docket No. 05\_TR\_102; Investigation of Intrastate Access Costs, Settlements, and IntraLATA Access Charges; Rebuttal Testimony on Behalf of MCI.

December 12, 1988; Docket No. 05\_TI\_116; In the Matter of Provision of Operator Services; Rebuttal Testimony on Behalf of MCI.

March 6, 1989; Docket No. 6720\_TI\_102; Review of Financial Data Filed by Wisconsin Bell, Inc.; Direct Testimony on Behalf of MCI.

May 1, 1989; Docket No. 05\_NC\_100; Amendment of MCI's CCN for Authority to Provide IntraLATA Dedicated Access Services; Direct Testimony on Behalf of MCI.

May 11, 1989; Docket No. 6720\_TR\_103; Investigation Into the Financial Data and Regulation of Wisconsin Bell, Inc.; Rebuttal Testimony on Behalf of MCI.

July 5, 1989; Docket No. 05-TI-112; Disconnection of Local and Toll Services for Nonpayment -- Part A; Direct Testimony on Behalf of MCI.

July 5, 1989; Docket No. 05-TI-112; Examination of Industry Wide Billing and Collection Practices -- Part B; Direct Testimony on Behalf of MCI.



July 12, 1989; Docket No. 05-TI-112; Rebuttal Testimony in Parts A and B on Behalf of MCI.

October 9, 1989; Docket No. 6720-TI-102; Review of the WBI Rate Moratorium; Direct Testimony on Behalf of MCI.

November 17, 1989; Docket No. 6720-TI-102; Review of the WBI Rate Moratorium; Rebuttal Testimony on Behalf of MCI.

December 1, 1989; Docket No. 05-TR-102; Investigation of Intrastate Access Costs, Settlements, and IntraLATA Access Charges; Direct Testimony on Behalf of MCI.

April 16, 1990; Docket No. 6720-TR-104; Wisconsin Bell Rate Case; Direct Testimony on Behalf of MCI.

October 1, 1990; Docket No. 2180-TR-102; GTE Rate Case and Request for Alternative Regulatory Plan; Direct Testimony on Behalf of MCI.

October 15, 1990; Docket No. 2180-TR-102; GTE Rate Case and Request for Alternative Regulatory Plan; Rebuttal Testimony on Behalf of MCI.

November 15, 1990; Docket No. 05-TR-103; Investigation of Intrastate Access Costs and Intrastate Access Charges; Direct Testimony on Behalf of MCI.

April 3, 1992; Docket No. 05-NC-102; Petition of MCI for IntraLATA 10XXX 1+ Authority; Direct Testimony on Behalf of MCI.

September 30, 2002; Docket No. 05-MA-130; Petition of Level 3 for Arbitration with CenturyTel; Direct Testimony on Behalf of Level (3) Communications, LLC.

October 9, 2002; Docket No. 05-MA-130; Petition of Level 3 for Arbitration with CenturyTel; Reply Testimony on Behalf of Level (3) Communications, LLC.

September 1, 2004; Docket No. 05-MA-135; Petition of Level 3 for Arbitration with Wisconsin Bell, Inc. d/b/a/ SBC Wisconsin; Direct Testimony on Behalf of Level (3) Communications, LLC.

#### **Wyoming:**

June 17, 1987; Docket No. 9746 Sub 1; Application of MCI for a Certificate of Public Convenience and Necessity; Direct Testimony on Behalf of MCI.



May 19, 1997; Docket No. 72000-TC-97-99; In the Matter of Compliance with Federal Regulations of Payphones; Oral Testimony on Behalf of MCI.

**Comments Submitted to the Federal Communications Commission and/or the Department of Justice**

March 6, 1991; Ameritech Transmittal No. 518; Petition to Suspend and Investigate on Behalf of MCI re Proposed Rates for OPTINET 64 Kbps Service.

April 17, 1991; Ameritech Transmittal No. 526; Petition to Suspend and Investigate on Behalf of MCI re Proposed Flexible ANI Service.

August 30, 1991; Ameritech Transmittal No. 555; Petition to Suspend and Investigate on Behalf of MCI re Ameritech Directory Search Service.

September 30, 1991; Ameritech Transmittal No. 562; Petition to Suspend and Investigate on Behalf of MCI re Proposed Rates and Possible MFJ Violations Associated with Ameritech's OPTINET Reconfiguration Service (AORS).

October 15, 1991; CC Docket No. 91-215; Opposition to Direct Cases of Ameritech and United (Ameritech Transmittal No. 518; United Transmittal No. 273) on Behalf of MCI re the introduction of 64 Kbps Special Access Service.

November 27, 1991; Ameritech Transmittal No. 578; Petition to Suspend and Investigate on Behalf of MCI re Ameritech Directory Search Service.

September 4, 1992; Ameritech Transmittal No. 650; Petition to Suspend and Investigate on Behalf of MCI re Ameritech 64 Clear Channel Capability Service.

February 16, 1995; Presentation to FCC Staff on the Status of Intrastate Competition on Behalf of MCI.

November 9, 1999; Comments to FCC Staff of Common Carrier Bureau on the Status of OSS Testing in Arizona on Behalf of MCI WorldCom, Inc.

November 9, 1999; Comments to the Department of Justice (Task Force on Telecommunications) on the Status of OSS Testing in Arizona and the USWC Collaborative on Behalf of MCI WorldCom, Inc.

**Presentations Before Legislative Bodies:**

April 8, 1987; Minnesota; Senate File 677; Proposed Deregulation Legislation; Comments before the House Committee on Telecommunications.



October 30, 1989; Michigan; Presentation Before the Michigan House and Senate Staff Working Group on Telecommunications; "A First Look at Nebraska, Incentive Rates and Price Caps," Comments on Behalf of MCI.

May 16, 1990; Wisconsin; Comments Before the Wisconsin Assembly Utilities Committee Regarding the Wisconsin Bell Plan for Flexible Regulation, on Behalf of MCI.

March 20, 1991; Michigan; Presentation to the Michigan Senate Technology and Energy Committee re SB 124 on behalf of MCI.

May 15, 1991; Michigan; Presentation to the Michigan Senate Technology and Energy Commission and the House Public Utilities Committee re MCI's Building Blocks Proposal and SB 124/HB 4343.

March 8, 2000; Illinois; Presentation to the Environment & Energy Senate Committee re Emerging Technologies and Their Impact on Public Policy, on Behalf of MCI WorldCom, Inc.

February 19, 2004; Presentation to the Iowa Senate Committee Regarding House Study Bill 622/Senate Study Bill 3035; Comments on Behalf of MCI.

#### **Presentations Before Industry Groups -- Seminars:**

May 17, 1989; Wisconsin Public Utility Institute -- Telecommunications Utilities and Regulation; May 15-18, 1989; Panel Presentation -- Interexchange Service Pricing Practices Under Price Cap Regulation; Comments on Behalf of MCI.

July 24, 1989; National Association of Regulatory Utility Commissioners -- Summer Committee Meeting, San Francisco, California. Panel Presentation -- Specific IntraLATA Market Concerns of Interexchange Carriers; Comments on Behalf of MCI.

May 16, 1990; Wisconsin Public Utility Institute -- Telecommunications Utilities and Regulation; May 14-18, 1990; Presentation on Alternative Forms of Regulation.

October 29, 1990; Illinois Telecommunications Sunset Review Forum; Two Panel Presentations: Discussion of the Illinois Commerce Commission's Decision in Docket No. 88-0091 for the Technology Working Group; and, Discussion of the Treatment of Competitive Services for the Rate of Return Regulation Working Group; Comments on Behalf of MCI.



May 16, 1991; Wisconsin Public Utility Institute -- Telecommunications Utilities and Regulation Course; May 13-16, 1991; Participated in IntraLATA Toll Competition Debate on Behalf of MCI.

November 19, 1991; TeleStrategies Conference -- "Local Exchange Competition: The \$70 Billion Opportunity." Presentation as part of a panel on "IntraLATA 1+ Presubscription" on Behalf of MCI.

July 9, 1992; North Dakota Association of Telephone Cooperatives Summer Conference, July 8-10, 1992. Panel presentations on "Equal Access in North Dakota: Implementation of PSC Mandate" and "Open Network Access in North Dakota" on Behalf of MCI.

December 2-3, 1992; TeleStrategies Conference -- "IntraLATA Toll Competition - A Multi-Billion Dollar Market Opportunity." Presentations on the interexchange carriers' position on intraLATA dialing parity and presubscription and on technical considerations on behalf of MCI.

March 14-17, 1993; NARUC Introductory Regulatory Training Program; Panel Presentation on Competition in Telecommunications on Behalf of MCI.

May 13-14, 1993; TeleStrategies Conference -- "IntraLATA Toll Competition -- Gaining the Competitive Edge"; Presentation on Carriers and IntraLATA Toll Competition on Behalf of MCI.

May 23-26, 1994; The 12th Annual National Telecommunications Forecasting Conference; Represented IXC's in Special Town Meeting Segment Regarding the Convergence of CATV and Telecommunications and other Local Competition Issues.

March 14-15, 1995; "The LEC-IXC Conference"; Sponsored by Telecommunications Reports and Telco Competition Report; Panel on Redefining the IntraLATA Service Market -- Toll Competition, Extended Area Calling and Local Resale.

August 28-30, 1995; "Phone+ Supershow '95"; Playing Fair: An Update on IntraLATA Equal Access; Panel Presentation.

August 29, 1995; "TDS Annual Regulatory Meeting"; Panel Presentation on Local Competition Issues.

December 13-14, 1995; "NECA/Century Access Conference"; Panel Presentation on Local Exchange Competition.



October 23, 1997; "Interpreting the FCC Rules of 1997"; The Annenberg School for Communication at the University of Southern California; Panel Presentation on Universal Service and Access Reform.

February 5-6, 2002; "Litigating Telecommunications Cost Cases and Other Sources of Enlightenment"; Educational Seminar for State Commission and Attorney General Employees on Litigating TELRIC Cases; Denver, Colorado.

February 19-20, 2003; Seminar for the New York State Department of Public Service entitled "Emerging Technologies and Convergence in the Telecommunications Network". Presented with Ken Wilson of Boulder Telecommunications Consultants, LLC.

July 25, 2003; National Association of Regulatory Utility Commissioners Summer Committee Meetings; Participated in Panel regarding "Wireless Substitution of Wireline – Policy Implications."

## **EXHIBIT TJG-2**

Arizona  
Docket No. T-01051B-05-0350 and  
T-03654A-05-0350  
L3C 01-024

INTERVENOR: Level 3 Communications, LLC

REQUEST NO: 024

Does Qwest offer any kind of foreign exchange ("FX") service in Arizona?  
If so, please provide a service description (including, but not limited  
to, tariff pages) for each such service.

RESPONSE:

Yes. Qwest offers Foreign Exchange (FX) service in Arizona. Qwest does not actively promote or advertise FX service, therefore, there is no additional material available for FX, other than the tariff, which is provided with this response as Attachment A.

Respondent: Larry Brotherson

Issued: 7-30-01

Effective: 8-29-01

ARIZONA  
DOCKET NO. T-01051B-05-0350  
and  
T-03654A-05-0350  
L3C 01-024  
ATTACHMENT A

## **5. SERVICES**

### **5.2 SERVICE DESCRIPTIONS (Cont'd)**

#### **5.2.6 FOREIGN EXCHANGE SERVICE**

##### **A. Basic Description**

Foreign Exchange (FX) Service provides dial tone from a wire center in an exchange from which the customer is not normally served. This service is available to either residence or business customers. While this service is available for resale by authorized resellers of FX Service, it may not be used as a vehicle for the sale of toll services.

##### **B. Terms and Conditions**

1. Where facility conditions permit, the Company will provide FX Service at the rates shown herein. Where FX Service is furnished at remote or isolated locations, or where facilities are not available, or where unusual costs are involved, additional nonrecurring, construction, and/or monthly charges may apply.
2. FX Service is normally furnished to a single customer premises. Where facility conditions permit, up to two additional points may be added.
3. When a customer subscribes to local service(s) and requests an extension in a foreign exchange, a Network Access Channel, Channel Performance and Transport Mileage, as specified for FX Service, will apply to the extension.
4. FX Service is not furnished in connection with party line or Smart Public Access Line Service.
5. Directory Listings
  - a. One directory listing will be provided for FX Service in the exchange where the customer's dial tone is obtained.
  - b. Additional listings will be furnished at regular rates and charges as specified in the Exchange and Network Services Price Cap Tariff.
  - c. Listings in other directories will be furnished at the regular rates for foreign listings as specified in the Exchange and Network Services Price Cap Tariff.

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Effective: 8-29-01

**5. SERVICES**

**5.2 SERVICE DESCRIPTIONS**

**5.2.6 FOREIGN EXCHANGE SERVICE**

**B. Terms and Conditions (Cont'd)**

6. FX Service will not be provided on the same circuit as Foreign Central Office (FCO) Service.
7. Message toll rates are applicable in connection with FX Service when calls are placed to telephone numbers outside the local calling area of the dial tone wire center.
8. Rates, terms and conditions associated with Directory Assistance apply and are set forth in the Exchange and Network Services Price Cap Tariff.
9. Use of Service limitations, as delineated in the Exchange and Network Services Price Cap Tariff, apply to FX Service.
10. FX Service provides unlimited access to and from the local calling area of the foreign wire center.
11. Rates and charges for all Optional Features and Functions are as specified in the Exchange and Network Services Price Cap Tariff.
12. FX Service will obtain a line or trunk from the Exchange and Network Services Price Cap Tariff. The Network Access Channel is also applicable.
13. The rates for individual line service and PBX trunks are those in effect in the serving (foreign) exchange.

Issued: 7-30-01

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**5. SERVICES**

**5.2 SERVICE DESCRIPTIONS**

**5.2.6 FOREIGN EXCHANGE SERVICE**

**B. Terms and Conditions (Cont'd)**

14. Locality, suburban or exchange zone rate area increments (ZNA/) for any main station or PBX located outside the base rate area of the normal exchange do not apply to FX Service.
15. In the case of Centrex main stations, the basic secondary location Centrex station rate schedule will apply at each FX station location in addition to mileage and/or incremental charges.
16. Transport Mileage will be measured and rated from the customer's serving wire center to the remote wire center.
17. Rate Elements
  - Exchange Service Element
  - Network Access Channel (NAC)
  - Channel Performance (CP)
  - Transport Mileage (TM)

**C. Service Information**

| SERVICE                | CLASS OF SERVICE              | NETWORK CHANNEL CODE |
|------------------------|-------------------------------|----------------------|
| Foreign Exchange Line  | XBAX+, XRAX+,<br>FXGT+, FRQT+ | UC                   |
| Foreign Exchange Trunk | XBAX+,FXGT+                   | UD                   |

## **EXHIBIT TJG-3**

Arizona  
Docket No. T-01051B-05-0350 and  
T-03654A-05-0350  
L3C 01-023

INTERVENOR: Level 3 Communications, LLC

REQUEST NO: 023

Does Qwest contend that the costs it incurs in originating a call to a Level 3 customer differ in any respect whatsoever based upon the physical location of the Level 3 customer? If Qwest responds to the above question with anything other than an unequivocal "no," please provide a detailed explanation of how the location of Level 3's customer on Level 3's side of the POI could affect Qwest's costs. Include in that explanation all cost studies and any other documentation in your possession that you believe provides support for your position those CLECs to other carriers. If your answer is anything other than an unqualified admission, please describe in detail your qualification or denial, and provide any information or evidence which supports your qualification or denial.

RESPONSE:

No. The costs Qwest incurs do not vary based upon the physical location of the Level 3 customer. Qwest's overall costs incurred to complete a call, however, vary depending on the originating voice caller's location and the location of the Level 3 POI.

Respondent: Larry Brotherson

**EXHIBIT TJG-4**

Arizona  
Docket No. T-01051B-05-0350 and  
T-03654A-05-0350  
L3C 01-082

INTERVENOR: Level 3 Communications, LLC

REQUEST NO: 082

Please admit that Qwest's end office and tandem switches do not store any information indicating the address or location of any end user's premises. If your answer is anything other than an unqualified admission, please describe in detail your qualification or denial, and provide any information or evidence which supports your qualification or denial.

RESPONSE:

Qwest can neither admit nor deny this request.

The telephone numbers that Qwest uses for call routing purposes are assigned to its end users based on NPA-NXXs associated with specific LCAs in the state. Thus, Qwest's end office and tandem switches process calls based on information that in most, but not all, cases identifies the general geographic area within which the end users are located. Thus, while switches do not route calls based on specific addresses stored within the switches, the routing and connecting function of switches are based on information concerning a customer's address and location located in other company databases. Furthermore, installation facts, repair facts, billing information and other related information related to specific customers are contained in company databases that are based on customer address and location information.

## **EXHIBIT TJG-5**

Arizona  
Docket No. T-01051B-05-0350 and  
T-03654A-05-0350  
L3C 01-063S1

INTERVENOR: Level 3 Communications, LLC

REQUEST NO: 063S1

Please admit that Qwest currently offers Qwest @ OneFlex™ Voice over Internet Protocol services within Arizona which provide customers "the option of choosing up to five additional phone numbers (virtual numbers) that will ring to your phone. Calls placed to a virtual phone number will ring the same phone as calls placed to your primary phone number. A virtual phone number can be beneficial if you have colleagues, friends or family living outside your local calling area. You could request a virtual number within their area and the people who live in that local calling area can call you for a price of a local phone call" If your answer is anything other than an unqualified admission, please, describe in detail your qualification or denial, and provide any information or evidence which supports your qualification or denial.

RESPONSE:

Qwest objects to this request on the grounds that it is an ambiguous and compound request and as such is an inappropriate request to admit.

Without waiving the foregoing objections, Qwest will supplement this response as soon as possible.

SUPPLEMENTAL RESPONSE dated 7/06/05:

Without waiving the foregoing objections, Qwest admits this request as to QCC but denies it as to Qwest Corporation.

## **EXHIBIT TJG-6**

Arizona  
Docket No. T-01051B-05-0350 and  
T-03654A-05-0350  
L3C 01-065

INTERVENOR: Level 3 Communications, LLC

REQUEST NO: 065

Please admit that Qwest charges approximately \$30 per month for its Internet phone service, plus 5 cents a minute for long-distance calls with a \$2.99 monthly fee. Please admit that the offering includes a full range of features, such as caller ID and voice mail. If your answer is anything

RESPONSE:

Qwest objects to this request on the grounds that it is an ambiguous and compound request and as such is an inappropriate request to admit.

Without waiving the foregoing objections, Qwest provides the following response:

Denied as to Qwest Corporation. Admitted with regard to QCC. The offering described in the request is one of the consumer offerings of QCC.